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TO ACCOMPANY

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TEACHERS' MANUAL

TO ACCOMPANY

FRYE'S GEOGRAPHIES

BY

ALEX EVERETT FRYE

Author of "Child and Nature," "Brooks and Brook Basins," "Primary Geography," "Complete Geography," etc.

E. P. Cubberley.

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TEACHERS' MANUAL.

I. GENERAL NOTES.

1. Ideas vs. Words.

No wide-awake teacher of to-day wastes his own time and that of his pupils by forcing them to memorize the exact words of a text-book. Such work is not *teaching*, and is not worth the smallest salary paid in the poorest school district.

The pupil who studies the text of a lesson and then expresses the thoughts in his own words becomes master of the lesson. A pupil who merely recites parrot-like the words of the text may not have grasped a single thought. Even if every sentence were backed by the proper thought, what a cruel waste of energy would result from trying to fix the exact words in mind for a day or at most for a week!

No teacher really believes in such work, for no teacher ever takes the trouble to force himself to memorize the text. He often drives pupils to this task because he does not know how to teach them to grasp an author's meaning. He thinks the meaning must be in the words and that the pupils must swallow them. *Such a teacher needs to learn how to teach!*

Definitions. — Of what use are definitions of hills, rivers, etc.? In daily life do we ever use them? Must a child *define* in order to *know?* Does he not know a

chair, a shoe, a horse? — yet has he learned to define them? Nay, he learns to *know* such things by *seeing* or *sensing* them.

Among countless objects that affect our life, why should teachers select the forms of land and water and claim that these few can best be known or studied through their definitions? Is it because pupils can hide ignorance in empty words and thus make a good showing in that form of examination which calls for husks instead of grains of thought? Let us hope not; yet if it be true, the number of teachers of this class is small, for the thoughtful teachers of to-day show by their work that they believe in the study of *things*, — not mere *word-shells*.

A pupil should learn to know a hill or a plain by studying the thing itself or a good picture of it. The teacher may use various devices to stimulate careful looking. Thus, he may tell the pupil to model, draw or describe it; and the attempt to express in either of these ways will lead to closer looking and so to the gaining of clearer mental pictures.

Let us illustrate by a *brook*. By one plan the pupil will learn the words, "A brook is a small stream of fresh water flowing over the land." By the other plan he will study the brook itself and may discover the following:

"A brook is running water. The water is fresh. The brook winds about. Where the brook is swift the bottom is steep. In some places the bottom is rocky; in other places it is muddy. The water moves slowly over the muddy bottom. The brook grows larger as it flows downward. In wide parts of the brook the water

moves slowly ; in narrow places it moves swiftly. The bottom of the brook slants downhill. The banks of the brook are in most places nearly parallel. The land slopes down to the brook on both sides and holds it in place." Etc., etc.

Which pupil knows more about a brook, the one who can recite the definition or the one who has learned the above facts by *seeing* and discovering for himself? Which pupil has gained the greater power in the study? Which has the knowledge better suited to his later life?

It is claimed that the "book" definition is better worded than any a pupil can make. What of it? The pupil will never use either. If such definitions are useful, why not also teach definitions of buttons, chairs, pins and countless other common objects?

The pupil has the *right* to learn to describe objects in his own words in order that he may gain in *power to see and express.* What right has the teacher to deprive him of growth, merely that in an examination he may appear to know what he does not really know?

Any examination that calls for *definitions* of geographical forms, and that does not give opportunity for the pupil to show his power to see and to think, is certainly far behind the times. Which is the better question, "Define a brook," or "Tell what you know about brooks and their uses"? Which tests the quality of the teaching? Which proves the ability of the pupil to see and to think?

The superintendent or school-board that gives broad examinations, based on the pupils' power to think, rather than on memory of details, wields a powerful weapon in the cause of good teaching.

2. Lessons on the Text.

When told that pupils should not memorize the words of the text, many teachers are at a loss to know what to do with the text. Pupils, also, who have been dwarfed by learning *words, words, words*, do not know how to study the lessons. They have not been taught how to crack the shell and get at the kernel, — in other words, how to get the thought out of a sentence. This work should receive the teacher's first care in placing before a class any text, — whether geography, history, arithmetic or reading.

To illustrate this step in the work, let us take the following text. Keep in mind that our aim is to teach pupils how *to study* the lesson, so as to make the thoughts their own.

The Land and the Sea.

Most parts of the sea *near the land* are shallow. Far from the shores the sea is in many places two miles deep, and in some places the bottom is four or five miles below the surface.

The land and the surface of the sea have light by day and darkness by night. They have also warm and cold seasons. No sunshine reaches the deep parts of the sea. The deep water is always cold and dark.

The land has many valleys and mountains, but a large part of the sea-bottom is a great smooth *plain*.

The wind blows sand and dust over the land and also makes waves on the surface of the sea, but the deep sea is very still. Part of the rain falling on the land feeds brooks and rivers, which carry or *wash* loose soil down the slopes and help to wear valleys in the land. Thus the form of the land is slowly changed.

Nearly all the soil which is washed into the sea settles in the shallow water near the shores. The smooth bottom of the deep sea hardly changes at all, for there are no streams to wear valleys in it, and very little soil from the land reaches these quiet waters.

The following *lesson-plans* suggest five different ways of teaching pupils how to study the text. Each of these plans, and others which the teacher's own ingenuity will suggest, may be used to give variety to the work.

Lesson-Plan 1. *Teacher.* — "Read the lesson through carefully; then take a paragraph at a time and write fully in your own words just what it tells. In this way write the whole lesson. Use words where you can that are not the same as those in the book."

With these directions the pupils prepare their lesson. When the time of study is ended, they are called on to read their work. Thus:

Teacher. — "William may read the first paragraph as he has written it."

William. — "The water along the seashore is not deep. Some parts of the ocean are four or five miles deep, and many are two miles. The deep parts are mostly far from land."

Teacher. — "Can any one correct William's thought?"

Albert. — "The book does not say that the water is shallow near all shores, but in *most places*."

Teacher. — "While William is correcting his work, Albert may tell how he has written the first sentence."

Albert. — "Along nearly all shores the bottom of the sea is not far below the surface. Out in the ocean the bottom is farther from the surface than it is along the shore. Many parts of the sea are two miles deep. Some places are known to be four or five miles deep."

Teacher. — "Did Albert get the whole thought?"

Thus the lesson proceeds, with the pupils noting any omission or error in thought, till the teacher is certain that the *meaning of the paragraph is firmly fixed in mind.* Then the next paragraph is taken up for discussion.

Teacher. — "Mabel may read the second paragraph."

Mabel. — "The bottom of the deep sea is never warm, because the sun cannot shine so deep through the water. The sunshine causes the seasons, and so there cannot be any change from winter to summer in the deep water, nor from night to day."

Teacher. — "Can anybody add to this paragraph? If not, Edith may tell what she has written for the same."

Edith. — "The sun shines on the surface of the earth and gives warmth, but the sunlight cannot reach very deep in water. There is no sunrise nor sunset seen down there, and there are no warm summer days. The deep water is chilly and gloomy."

Teacher. — "Grace may read her next paragraph."

Grace. — "There is level land under much of the sea . . ." Etc.

When the pupils have discussed every paragraph, there can be no doubt about the lesson being known. While the paragraphs are being read, the teacher goes quietly through the aisles, glancing at the work of each pupil to see that it is carefully done. Less than half a *minute's examination* of each paper tells the story.

If the teacher wishes to impress still further the facts of the lesson, the pupils may be asked to close their books and write from memory what they have learned. This may be their language work for the day. All the papers need not be read, but the teacher may wish to look over the papers of those who are inclined to do careless work, to see if they should be told to do the work again. A glance at each paper will show what is needed. It is a great waste of time and energy to try to read all written work of pupils.

Lesson-Plan 2. It is an excellent plan to have pupils study a lesson by writing a list of questions which shall bring out the various thoughts in the text. The pupils are told to make their own questions. If such work is new to the pupils they may not know how to begin. In this case the teacher may illustrate as follows:

Teacher. — "Albert may read the first paragraph."

Albert. — "Most parts of the sea near the land . . ." etc.

Teacher. — "We do not wish Albert to remember the exact words, but we wish to know whether he knows the meaning of the paragraph. You may each write a question for Albert about what he has read."

Grace. — "What parts of the sea are shallow?"

Mabel. — "Can you tell where there are any shallow parts of the sea?"

Edith. — "What have you learned about the sea near the shore?"

Ada. — "What does *shallow* mean?"

Frank. — "What do you mean by *the sea?*" Etc., etc.

Teacher. — "Those are all good questions, and if Albert can answer them he knows the meaning of the words he read. You may all read the rest of the lesson and make questions about every part, as you have done with the first paragraph. Perhaps some sentences will need two or three questions to bring out the full meaning.

"When the time comes to recite this lesson, you may ask each other questions that you have written. Be sure that you can answer your own questions and then you can feel quite sure that you can answer the questions which others ask."

With these directions the pupils study the text, — to search out the meaning in order to ask questions. When a pupil has made a good series of questions, the teacher may feel certain that the meaning of the text is clear and that the pupil has made the thoughts his own. The following may suggest a form of recitation for this lesson:

Teacher. — "Grace may read her first question."

Grace. — "What parts of the sea are shallow?"

Teacher. — "Edith may answer."

Edith. — "The shallow parts are along the shores."

Teacher. — "Do all agree? Does the text say so?"

Albert. — "The text does n't say that *all* the shallow parts are near the shores. It says the sea is shallow near most shores, but it does not say the sea is not shallow in some places far from the land."

Teacher. — "How many of you agree with Albert? Does anyone differ? If not, Helen may ask another question about the first sentence or the second."

Helen. — "What does *shallow sea* mean?"

Teacher. — "Ada may answer."

Ada. — "Shallow sea is sea that is not deep."

Teacher. — "Who can tell that in another way? — William."

William. — "In shallow water the bottom is not far below the surface."

Teacher. — "The book does not tell how far from the land the water is shallow. In some places the shallow part reaches only a mile or two offshore, but in other places the deep water begins at about a hundred miles from the land. When we think of an ocean thousands of miles wide, a hundred miles may be called a short distance. When we think of parts of the sea two or

more miles deep, we may call the water shallow even where it is several hundred feet deep. We mean that it is shallow compared with the deep sea.[1]

"Mabel may ask a question."

Mabel. — "How deep is the sea far from the shores?" This question, and many others, are discussed.

If the teacher has good control of the class, he can greatly add to the interest of the lesson by allowing the one who asks a question to name the pupil who is to answer. If the teacher sees that some pupils are slighted, he can easily remedy the evil by suggesting that no pupil be asked to recite twice until all have recited once; or he may use a more direct means and name the pupil who is to answer.

When the teacher sees that the questions do not call out all the leading thoughts of the text, he can assist by asking questions. It will be found a pleasing device to allow the pupil who has given a correct answer to ask the next question and select the one to answer. The tendency of this device will be to draw out the pupils who are most backward, for pupils take just pride in proving that they have found thoughts in the text which others have passed blindly over. A few lessons of this kind will cultivate the most careful study of the text.

This lesson-plan does not call for the examination of the various papers written by pupils. Each takes some part in asking and answering; moreover the pupils soon learn to feel that the great value in writing

[1] This note by the teacher is added to suggest that he should at all times be ready and free to draw on his own fund of knowledge. With this in mind, many notes on the lessons in the geography have been placed in this *Manual* for the teachers.

the questions lies in the fact that the answers are at the same time learned. The recitation gives all an opportunity to show how fully the lesson has been learned. If at any time a pupil finds that the class is passing over an important part of the text, he should be encouraged to show that he has a good question to ask.

When the lesson is over, if the teacher wishes to impress the facts still more, he can ask the pupils to write from memory what they have learned. This need not be done, however, if the teacher thinks that the facts of the text are well known.

Lesson-Plan 3. Now and then the teacher can vary the lesson-plan by placing a list of topics on the blackboard and asking the pupils to learn what the text teaches about the topics. A glance at a paragraph will tell the teacher what the topic is. For example, we will select from our sample lesson the following topics:

1. Depth of the sea.
2. Sunlight in the sea.
3. Surface of the land and sea-bottom.
4. Action of wind and rain.
5. Changes in the sea-bottom.

REVIEW: — Tell how the land differs from the sea-bottom.

The work of the pupils is now to find what the text teaches about each topic. They are to study the lesson till they can close the book and *in their own words* recite the thoughts of the text.

At first it may be wise to ask the pupils to write their answers to the topics. The teacher can then glance over the papers of the weaker pupils and help them. After a few lessons the pupils will be able to study without writing.

The recitation may take some such form as this:

Teacher. — "Tell what you can about the depth of the sea, Albert."

Albert. — "The deepest parts are far out in the ocean. There are some places five miles deep. There are many parts of the sea near the shores that are not very deep."

Teacher. — "Recite on the same topic, Mabel."

Mabel. — "There are some deep places near the shores, but there are more shallow places. Many parts of the ocean are two miles deep. Most of the deep places are far out in the sea. Some deep hollows are four or five miles below the surface."

Teacher. — "Does any one wish to ask Mabel or Albert a question?"

Edith. — "I should like to ask Mabel how she knows that there are deep places near the shores. The lesson does n't say so."

Mabel. — "The text does n't say that the sea is shallow all along the shores, but that in nearly all places it is shallow. If all places are not shallow, some must be deep."

Grace. — "How does Albert know that the deepest places are far out in the sea?"

Albert. — "I think the text says so."

Teacher. — "Let us all open our books and find out. Can any one find a statement like Albert's?"

William. — "The text does n't say just what Albert did, but I think it means that. The first sentence tells about the sea near the land and does n't speak of deep places. The second sentence is about the sea far from the land, and this sentence does speak of the very deep places in the sea. I think that if there were still deeper places near the shore the text would say so."

As the class agrees with William, the teacher calls *for the second* topic from Ada.

Ada. — "When the sun shines it lights the land and the upper part of the ocean. The sun warms them also. Sometimes the days are warmer than at other times and we have spring, summer, autumn and winter. The bottom of the deep sea has no sunshine. The sun can't shine deep in the water. It must always be dark down there, and if the sun's heat does not reach so deep it must be very cold all the time."

Mabel. — "Is n't it a little warmer on the deep sea-bottom in summer than it is in winter?"

Teacher. — "What do you think about it, Grace?"

Grace. — "If the sun never shines there I don't see what difference it makes whether it is summer or winter at the surface."

Albert. — "If it is so cold why does n't the water freeze?"

If the teacher cannot answer this question, he should frankly say, "I don't know, but I will try to find out and tell you." The most learned man in the world cannot answer a tenth part of the questions which a little child may ask about any lesson in this book. Such questions are likely to crop out at any time in all studies. It is a great pleasure to be able to say now and then to a class, "I don't know, but I will try to find out." It fills the pupils with the same spirit, — "I don't know, but *I will try to find out.*" If you would develop honor in children, be honest with them. If the questions are such as you ought to be able to answer, be sorry that you cannot, but be frank.

On the other hand, if you can answer the question, do not hesitate to do so even though you know that the pupils cannot grasp the full meaning. The answer will show them the need of growth. Thus the teacher may answer Albert's question as follows: "The water is very cold, but not cold enough to freeze. Fresh water freezes at the temperature of 32°, but salt water must

be about four degrees colder before it changes to ice. In many parts the deep sea reaches 30°, but that is not cold enough to form ice. Besides, water expands as its temperature nears the freezing point, and this expanded water, being lighter, rises till it reaches a place in the sea where it becomes warmer. The deep sea therefore can never freeze."

Teacher. — "William may tell what he knows about the surface of the land and the sea-bottom."

Thus the work goes on till all the topics have been discussed. The pupils receive their best growth, not from the study of the text, but from the contact of mind with mind in the recitation ; yet the study of the text affords a common ground for the meeting of the minds.

The last topic is headed "*Review.*" This topic is made broad enough to cover the entire lesson and may serve as a subject for a written lesson, if the teacher desires. If the teacher is sure that the pupils know the meaning of the text, this written exercise may not be desirable. It will tend, however, to fix the facts of the lesson.

Lesson-Plan 4. *Teacher.* — "You may study to-day's lesson so as to be able to answer any questions I may ask about it. As you study the text you had better think what questions I may ask and learn to answer them. Do not try to learn the words of the book."

The teacher, as well as the pupils, should prepare for the recitation. He should read the text carefully and place a question mark near each word that suggests a question. When the class is ready to recite he can then readily glance at the catch-words thus marked and *quickly frame his* questions.

The questions may deal with the details of the text, as follows:

What does the word *shallow* mean? What is *the sea?* What parts of the sea are shallow? What parts are deep? How deep are some of the great valleys of the sea-bottom? Etc., etc.

Or, the text may deal with broader topics resembling more those of lesson-plan 3. In this lesson the pupils have not had the topics in sight for study, but have been learning to read or study a text without such aid. For the recitation the teacher may ask a pupil to tell what he knows about the depth of the sea; the sunlight in the sea; the surface of the land; the sea-bottom; the work of wind and rain on the land; etc.

Lesson-plan 4 is more difficult than either of the preceding, yet it is the way that pupils must learn to read and study books, — that is, without questions or topics. After leaving school they cannot find such helps in the books they will study.

Lesson-Plan 5. *Teacher.* — "After you have studied to-day's lesson you may write for me what the text teaches. I do not want you to learn the words of the book, but give me the thoughts in your own words. As you study, think of some topics to remind you of the various parts of the lesson. These will help you to write in paragraphs. If you have good topics you will be less likely to forget the parts of the text. Perhaps as you study you can think what you will wish to write."

After the lesson is written the papers may be collected *and then distributed* at random among the pupils. The

teacher then directs: "Read carefully the paper which you have and see if any thoughts are missing. If so make note of them at the bottom of the paper. Those sitting in the back seats may collect the papers and return them to the pupils who wrote them. Look at the notes on your own paper and see what you forgot to write."

This exercise is of value in several ways. It often places an excellent paper in the hands of a backward pupil and so stimulates him to better work by giving him a better ideal; it gives every pupil a chance to look at the lesson from the standpoint of some other pupil; it makes pupils careful both in the reading of another paper and in the writing of their own; it gives the teacher opportunity to move through the aisles as the pupils are studying the papers and to note the work of the backward pupils. The brighter ones need little attention, but they get what they do need, — namely, practice in getting and giving thought.

Do not feel that every paper should be carefully read by the teacher. It is a great waste of time to try to correct every mistake. Select three or four from each lesson and before you realize it hundreds of minor errors will be outgrown. In fact the unusual errors will correct themselves, or will be corrected without the teacher's aid. Let the teacher direct his energy against the greatest fault.

Comments. — Teachers whose ideal rises no higher than the assigning of lessons to be learned word for word, do not of course wish to use text that describes or explains. If the object is to teach empty words, a

child can memorize the sentence, "A plain is level land," more quickly than two or three pages of text explaining how the various kinds of plains were formed, — some along the banks or at the mouths of rivers; others by the slow uprising of smooth sea-bottoms; others by the spreading of lava over great areas; others by the draining of large lakes; etc., etc. By the former plan he knows nothing more than a *name* for level land; by the latter plan he knows, not only *how* the vast plains of the earth were formed, but also *why* some are suited to produce wheat, cotton, grass, etc., while others are barren.

For actual teaching, — not mere word-learning, — the text which fully describes and explains is far simpler than the definitions and other text which for many years have been trimmed and pruned till not a leaf, twig or even a branch is left on the worm-eaten old word-trunks. It is the writer's firm belief that no teacher who has tried to teach text by lesson-plans like those above (and the number of such teachers is legion) will ever long for the drudgery of driving pupils to crowd their minds with the exact words of any geography.

Moreover, pupils should be trained to read or get thought from the kind of text which will be constantly before them in later life, — in newspapers, magazines, works on travel, history, biography and general literature. Such works consist of descriptive text never to be memorized word-for-word, but from which the reader is to glean the grains of thought.

In other words, THE FULL DESCRIPTIVE TEXT IS NOT ONLY THE EASIEST TO TEACH, BUT IT IS THE ONLY *KIND FROM* WHICH PUPILS CAN BE TAUGHT TO GET *AND GIVE* THOUGHT!

3. Text in Small Type.

The following note appears in the *Preface* of the *Complete Geography:* "The subject-matter which needs most careful study is in large type. The explanatory and descriptive matter in small type does not call for close study, but may be used for *supplementary reading.*"

These small-type notes fill out the thoughts expressed in the large type, and often explain or describe features or phenomena of general interest, yet not essential to a *brief* course in geography.

To illustrate the use of text in small type, we will take a note from page 68 of the *Complete Geography*, as follows:

"In the gravelly river banks of the Siberian tundras, fossil elephants are found. These had woolly coverings that fitted them to live in the cold plains. The 'woolly elephants' are unlike any now found on the earth; yet the flesh of these great beasts, after being buried perhaps for many centuries in the frozen ground, is sometimes found well preserved and is eaten by dogs.

"The tusks of these fossil woolly elephants have for a long time supplied part of the ivory so finely carved in China and Japan."

When the lesson containing this small-type note is assigned to the class for study, the teacher may say, "You need not study the part of the lesson in small type, but read it carefully and find out where the people of Japan and China obtain some of their ivory," — Or, the teacher may simply say, "Read the note in small type and find out what it tells about ivory."

All that is needed to guide the pupils in the study of the matter in small type is a topic for each leading thought. Many of these notes need no further study than comes from reading and briefly discussing them during the recitation period. Teachers may judge that some of the notes are worthy of close study according to the plans suggested for the text in large type. On the other hand, the teacher may decide to pass over some parts of the text in large type, treating it like small type.

4. The Use of Pictures.

The pictures are an essential part of the geography and deserve as careful study as the text or the maps. Nearly all the pictures were engraved directly from photographs and are true to nature in all details. Great care was used to select only typical views.

The various pictures are not all to be studied in one manner. Some are suitable to describe in words. Pupils may model or draw others, or parts of them. The picture of a Lapland family, on opposite page, will serve as an example of one suitable to describe. The teacher may assign the study work as follows:

Teacher. — "Write what the picture shows you about the Lapps and the way they live."

Pupils will readily see that the Lapps wear thick coats and warm caps; they bind up their legs; they live in a hut made of sods; the hut has a wooden door that swings out: the hut is rounded in form; it is low and small for so many people; the hut is dark; it has no windows; etc., etc.

If pupils are not guided by the teacher, they may ramble too much in the description. It may be well to ask them to tell what they can about one object before going to another.

The lesson may take the form of studying from topics. The teacher places upon the blackboard a few guiding words, — as *people*, *deer*, *hut*, — and asks the pupils to write what they can about each.

When they have been trained to see and describe, the work may take a broader basis. Thus, the teacher may ask such questions as these :

"What is there in the picture to show whether these people live in a rainy land or in a dry one?"

Pupils readily see that without rain there would be no grassy sods for the hut; no moss nor branches for the reindeer; no wood to burn; no wood for the doorway, etc.

They can also find proof that the air is cold, in the way the hut is built; the coats, caps and boots worn there; the mittens on the girl's hands; the fire in the hut; etc. Perhaps some pupils know that reindeer live in cold lands.

Even if the teacher were to ask whether these people read books and newspapers, the pupils might judge after seeing how dark the hut is inside, with no windows; how cold the air must be outside; also, how lacking in intelligence the faces seem.

After the pupils read the text and learn that the reindeer live in a land that is snowy in winter and in places marshy in summer, they may be led to still closer study of the picture, — to see, for example, how well fitted the broad hoofs of the deer are for travel

over the snow or the marshy tundras, and also for scraping away the snow to find moss; how the sods are placed on the hut, to shed rain or snow water; how the binding of the boot-legs helps to keep the warmth in, and the snow or water out; etc. Locate Lapland on the map of Europe.

This picture shows more about the life of the Lapps than could be told in a long chapter of text. Unless such pictures receive careful study, the geography is not used to best advantage.

Pictures as Models. — Many of the pictures in the geography were selected as types of land and water forms for modeling. The sand or the clay is merely the means by which the pupils are led to *observe the forms* in the pictures.

Take, for example, the two pictures on following page. The first shows a volcano with a lava-flow between the two river branches. The second picture shows the same region after ages of weathering and erosion. The lava now rises as a *mesa*, — a common form in our western states. The volcano now appears only as a remnant or "neck" of hard lava that once filled the opening in the volcano.

If any teacher wishes to prove the value of sand or clay as a means of leading to careful seeing, let him model the forms in these two pictures, — first, the young volcano with its setting of bluffs, valley and lava-flow; then change the *same model* so as to show the mesa and neck. Do not simply try to imagine what the work would be, but *do the work itself*, — actually model the two pictures and the result will prove a pleasing surprise.

Model the pictures as if looking down on them *from above.* Slight portions must of course be supplied from

YOUNG VOLCANO.

the imagination, yet this part of the work has great value in raising the question as to what forces must

MESA AND VOLCANIC NECK.

have shaped the unseen portions and, therefore, what *the shape must* be.

When preparing to teach the various lessons, the teacher can readily select such pictures as are best suited for modeling. This work with clay or sand is not essential, but it is certainly very helpful. If the modeling cannot be done during school hours, many pupils may be led to try the work at home.

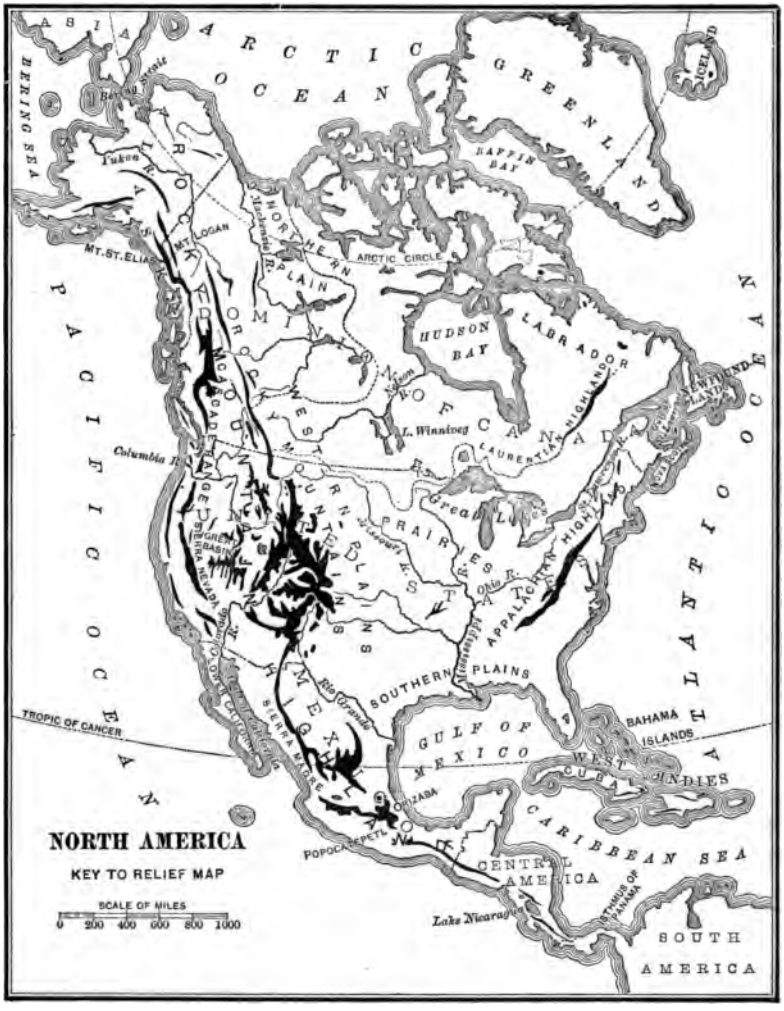
Many of the pictures, or parts of them, are suitable for drawing, — especially plants, animals, simple buildings, diagrams and some of the land and water forms. The drawing is simply a means of leading pupils to observe more closely. If any teacher doubts the value of this device, let him try to draw these little snow crystals and see what beauty he finds in them.

5. The Use of Maps.

Maps should be studied like pictures. The aim of the map study should be, not only to gain knowledge of the world's chief features, but also to gain *power to read maps*, — that is, power to get thought from maps as from text.

The study of map questions alone will not develop the needed power. In fact, the best map study can be done without the usual questions.

Let us select a lesson on the relief map of North America. Our aim will be to lead the pupils to read the map. With the geographies open at page 28 of the *Complete Geography*, the teacher says: "What does the map show you about North America?"


NORTH AMERICA
KEY TO RELIEF MAP
SCALE OF MILES
0 200 400 600 800 1000
ARCTIC OCEAN
GREENLAND
ICELAND
BAFFIN BAY
BERING SEA
Bering Strait
Yukon R.
MT. ST. ELIAS
MT. LOGAN
ROCKY MOUNTAINS
NORTHERN PLAIN
Mackenzie R.
ARCTIC CIRCLE
HUDSON BAY
LABRADOR
NEWFOUNDLAND
L. Winnipeg
LAURENTIAN HIGHLANDS
Columbia R.
CASCADE RANGE
GREAT BASIN
SIERRA NEVADA
Missouri R.
Great Lakes
PRAIRIES
Ohio R.
APPALACHIAN HIGHLANDS
Mississippi R.
SOUTHERN PLAINS
Rio Grande
SIERRA MADRE
LOWER CALIFORNIA
TROPIC OF CANCER
GULF OF MEXICO
BAHAMA ISLANDS
WEST INDIES
CUBA
ORIZABA
POPOCATEPETL
CARIBBEAN SEA
CENTRAL AMERICA
Lake Nicaragua
ISTHMUS OF PANAMA
SOUTH AMERICA
PACIFIC OCEAN
ATLANTIC OCEAN

At first the answers will be rambling, and the teacher wishes them to be, for the pupils need a general view of the entire map. Thus, the answers may come as follows:

"There are high mountains along the west side. North America is wide at the north and narrow at the south. There are low mountains in the east. The middle of the continent is a great plain. The eastern coastline is more irregular than the western. There are several large lakes in the plain." Etc., etc.

When the pupils have discovered the relations of the principal features, the work may be made more specific by saying to the class, "Tell me more about the great western highland."

The pupils will see that it is very long; its ranges extend northwest and southeast; it is highest not far from the southern end; the middle part is widest; the highest ranges are on the east and west sides of the highland; three large rivers from the highland flow to the sea on the west; etc.

For another lesson, the teacher may direct the class to tell what the map shows about the great central plain; or the eastern highland; or the coastline; or the rivers. This work may be oral or written. If one or two of these topics are assigned for a study period, the answers will form an excellent reading lesson; moreover, by having the answers read aloud, pupils can find out what important parts of the map they failed to see.

At first little attention need be paid to names of features on the maps. As soon as the teacher wishes pupils to learn the names, he may assign a lesson as

follows: "Write a description of the surface of North America, using any of the names you wish as shown on the *key map* on page 29 of the geography." This work may be varied according to the lesson-plans suggested for the text, in the preceding pages. In fact, the same plans may be used for text, maps or pictures.

The map studies in the *Complete Geography* are carefully graded, so that pupils are made to rely more and more on their own *seeing*. Thus, compare the map studies on page 29 (North America) with those on page 97 (Australia). In the latter the pupils are made to rely almost entirely on their own power to read the map.

It would perhaps be a good plan to use the map studies given in the geography, *after the pupils have made a careful study of the map itself*, but not before. These will serve to review what the pupils have discovered and will also help to group or relate the important facts.

6. Map Drawing.

Map drawing is a device for training pupils to see or to read maps. The first question for the teacher is this: What should a pupil be led to see in a map? The second question is: How should he be led to see?

First. Pupils should know the general shape of a continent; the general directions of the coastlines; the great peninsulas and arms of the sea that affect the climate of large natural regions; important commercial

bays and harbors. They need not know the details of coastlines, which exert little if any influence over the life of the continent.

Finely finished maps, showing hundreds of details which are worse than worthless in the mind, — simply clogging the memory or crowding out the broader and more useful knowledge of general features, — might look pretty if they did not serve to remind us of a great waste of time and energy. Pupils should be trained to draw carefully such parts of a map as are worth remembering.

The following account of actual lessons may suggest a simple plan for teaching map drawing[1]:

First Lesson. *Teacher.* — "Turn to the map of North America, on page 178 — *Complete Geography.* Draw a straight line showing the general direction of the northern coast."

"Look closely at the map and then at your line. Can you do better? Try again."

This work was repeated till the pupils could readily draw the line in the proper position.

Teacher. — "Draw a line showing the general direction of the east coast." This line was drawn again and again, till fixed in mind; then the pupils learned to draw a line for the west coast. No attempt was made to connect the three lines.

Teacher. — "Which is the longest line?"

Pupil. — "The west line is the longest."

Teacher. — "How do the north and east coasts compare in length?"

Pupil. — "They are about equal."

[1] Pupils may work at the blackboard. If there is not enough *blackboard room* for the entire class, part can draw on paper.

Teacher. — "Now draw the three lines together, showing the general directions of the coasts."

"Compare with the map and try again." "Try once more." So the work went on till the pupils could readily indicate the general shape of the continent.

Second Lesson. *Teacher.* — "Study the map (page 178) and then draw the general shape of North America, using three straight lines." (This was repeated three times in order to fix the shape in mind.)

"Now draw the northern coastline, as it appears on the map. Compare with the map and try to improve your drawing. Draw the north coast again."

"Practice drawing the east coast till you can draw it from memory."

"Draw the north and east coasts together."

Third Lesson. *Teacher* (after a review of lesson 2). — "Practice drawing the west coast. Study the map each time you draw."

"Now draw the entire coastline of the continent. Compare carefully with the map and draw again. Repeat till you can draw it from memory."

* * *

In teaching map drawing, no construction lines are needed except such as pupils *discover* in the relative directions of coastlines. These directions may easily be judged. The effort to discover and draw tends to fix the lines in memory.

The above lessons on North America will serve to illustrate one plan of training pupils to draw the outlines of the continents. The general shapes of South America and Africa can be shown by three lines.

Australia is so simple that pupils can sketch it off-hand, without first indicating the general directions by straight lines. Europe and Asia may each call for four lines, though three serve very well.

The value of this work is in leading the pupils to *discover* for themselves the general directions of the coastlines.

If the class is to use the device of sand modeling, the mountains and streams can be shown on the raised sand maps and need not be taught by drawing; but if the sand table is not to be used, the pupils should draw the rivers and mountains. The *guide maps* on pages 178–80 of the *Complete Geography* suggest the amount of details that a class may reasonably be expected to memorize.

These guide maps are based on several principles, among which are these: (1) The coastlines show the chief indentations and projections which affect the climate of large regions. (2) The rivers on the maps show where the principal slopes of the river basins meet. (3) The mountain ranges are those which form the chief divides between the large river basins.

The relief maps on pages 178–80 show the comparative areas of the continents. These areas are also shown on the various globe maps in the geography, — for example, on page 29 and 55.

7. Use of Molding Sand and Clay.

Map modeling, like sketching or drawing, is a means of arousing and directing mental activity. Being simply a device, sand modeling may or may not be used, as

teachers judge best. A few suggestions may prove helpful to those who model in sand.

In the study of a school district the attempt to model hills, valleys, plains, etc., using either nature or good pictures for models, leads pupils to look closely at the forms; but *the sand should never be used in the place of nature or pictures of the same.*

In the study of a continent, molding sand may be used to show the main slopes and other general features; but the character of the surface, — that is, whether rocky, sandy or loamy, fertile or barren, young or old, — can best be learned from pictures and text.

Care of Sand. — Fine sand of any kind can be used. Iron-molder's sand is excellent, when sifted.

Keep the sand *moist* by *sprinkling* upon it a little water each day after using. Do not try to mix the sand while wet, but let it stand over night and the water will filter evenly through it. If kept in a covered box it will need but little water. The exact amount must be learned by practice. The sand retains its form best when only slightly damp, and should never be wet enough to stick to the hands.

The Sand Table. — Make a table-top about three by four feet, with a rim raised two inches. Use seasoned wood.

Place the top on a small table or stand, about 32 inches in height. Fasten at one end by hinges so that it may be tipped towards the pupils. Strips of wood, like those used to hold up piano-tops, may be used to support it at any angle.

A zinc-lined drawer placed under the table-top will be found convenient for holding the sand, although it

can be kept in any common box or bucket. A coat or two of blue paint on the table will tend to preserve it and give a good background for the sand.

Model Tins. — In many schools each pupil is supplied with a tin tray upon which he models while the teacher is making a large map on the sand table. This device insures individual attention and work by requiring all pupils to model at the same time.

Model tins can be supplied by any tinsmith. They are simply shallow pans. They should be made of stiff tin, 14 by 20 inches, hemmed, rimmed one-half inch, with the hem turned out and corners soldered.

Potter's Clay. — Potter's clay, such as is used in kindergartens and primary schools, is excellent for making careful models of natural forms of land and water, either from nature or pictures of the same.

Some teachers use putty, papier mâché or modeling wax for making models of maps that are to be kept for a long time. We should not forget that the *making of the map*, and not the map itself, is of greatest value to the pupil. It will therefore doubtless be found that sand is the best material for general modeling.

8. Map Modeling.

A marked fault in geography work is the attempt to teach too many details of relief, outline and location. Pupils are often forced to learn the names of hundreds of unimportant forms of relief, as well as places, which teachers themselves cannot retain in memory. There are not *too many* studies in the public schools, but there is *too much* study of worse than worthless details. The

chief purpose of the maps on pages 178–80, of the *Complete Geography*, is to indicate the few essential features of relief of the continents.

Before beginning to model a continent, — for example, North America — the teacher and the pupils should learn to draw the general outline. Practice drawing upon the blackboard, and make the outlines of the maps as large as they will be on the sand table.

Spread about two quarts of damp sand in a very thin and even layer over the table. Draw the outline of the map in the sand. Brush all the spare sand into one corner of the table.

Next build up the great plateaus — not mountain ranges. On a table-top three by four feet, use a scale of about one fourth of an inch for 1000 feet. As the chief object of the modeling is to show the relative positions of main slopes, do not waste time in making exact measurements of the depth of the sand. What the eye cannot readily detect cannot wrongly impress the minds of pupils. Lay stress on the *slopes* rather than on the depth of the sand.

Thus, model the broad plateau in the western part of the continent. Let it extend the entire length of the Pacific coast. Notice that the high land spreads from the Sierra Nevada and Cascade range to the Rocky mountains, and thence descends *gently* eastward into the great central river basins.

At the isthmus of Tehuantepec the highland drops into low hills. The *plateau* of Mexico is about 8000 feet high, — the ranges being much higher. The average height of the Great Basin is about 4000 feet. There is a general descent of the western plateau from

Mexico to the Arctic coast. The plateau level in Colorado is about 6000 feet above the sea.

It is an easy matter to estimate the needed depth of the sand on the table. The 800 feet in Mexico may be shown by two inches ; but if this depth is too great for convenient modeling — owing to the narrowness of Mexico — do not hesitate to make it lower. The height of the Great Basin will be shown by one inch of sand.

Next model the *plateau* of the eastern highland, extending from Alabama to Labrador. The general level is a little under 2000 feet. Make the depressions for the St. Lawrence, Champlain, Hudson and Mohawk valleys. From the region of the Great Lakes build the Height of Land westward towards the Rockies, — the elevation in the lake region being about 1000 feet above sea level. Next model the low plateau on the east side of the Mackenzie basin.

From all the highlands thus built, model the slopes of the river basins forming the great central plain. Make the slopes so that they will meet in the beds of the large rivers. Thus the slopes from the Rocky and Appalachian mountains meet in the bed of the Mississippi. The Ohío and Missouri rivers show where the southern slopes from the Height of Land meet the slopes from the Appalachian and Rocky mountains. Lead the pupils to think of river beds as the lines along which slopes meet at their lower edges.

Model the Pacific and Atlantic slopes.

Do not forget that the prime object of the modeling is to show relative positions of main slopes ; therefore, see that every portion of the map shows *slope*.

Next build the mountain ranges. Lead pupils to think of the ranges as marking the upper parts of some of the slopes. Others do not end at the crestlines of ranges, but blend with other slopes in plains, as in many parts of the Height of Land.

The following principle is suggested to guide teachers in the selection of important ranges for modeling: *Model the ranges which divide great river basins.* Pay no attention at this stage to the location of particular peaks, but simply give the ranges a broken or other characteristic appearance. The peaks worthy of special study can be added later when they are subjects of a lesson, or they can be located on the maps in the geographies.

Look for the chief centers of drainage, — the regions from which many great rivers flow. North America has three, namely: The region about Yellowstone park for the Missouri, north branch of the Colorado, southeast branch of the Columbia, Rio Grande, etc.; the Rocky mountains of British Columbia for waters reaching the Fraser, Columbia, Saskatchewan, Athabasca and Mackenzie; the Height of Land in which rise the Mississippi, the Red river and others.

Now trace the beds of the great rivers shown on the relief map, page 178. A simple device is to groove slightly the sand, using a pencil point, but taking care not to cut through to the table top. After tracing the rivers, begin near the mouth of each and see that the land actually slopes upward to the source; also that the river beds lie at the lower edges of the side slopes. The Great Lakes may be traced with a pencil point, and then slightly depressed.

With a thin strip of wood or any sharp edge, cut the relief map into two parts and sketch the cross-section thus made. This is an excellent device for teaching the slopes and the comparative heights. Let one cut be made across the principal highlands, and another following the greatest valley. Thus, in North America the sections may be shown from San Francisco to Cape Hatteras, and from the mouth of the Mississippi to the mouth of the Mackenzie. Other sections also may be shown as the map is modeled on different days.

After a little practice, teachers can model a continent in from five to ten minutes. Try to make the work simple, by omitting useless details. The hints given above will enable teachers to model any continent, using as guides the maps in the supplements of the Primary and Complete Geographies.

The following table of general elevations of *plateaus* (in feet) may prove helpful in modeling:

South America.		Europe.	
Bolivia	12,000	Swiss	2,000
Brazil	2,000	Spanish	2,000
Guiana	2,000	Valdai hills	1,000
Central plain	250	Scandinavian	2,000
Asia.		**Africa.**	
Tibet	14,000	Abyssinia	7,000
Middle Basin	3,000	Kongo basin	2,500
Gobi desert	4,000	Zambezi basin	3,000
Altai	4,000	Kalahari desert	3,000
Hindustan	1,500	Sahara desert	1,000
Persia	4,000	Atlas	2,000
Asia Minor	3,000	Central Lake region	4,000

Australia.

The border highlands are about as high as the eastern highlands in North America.

II. PRIMARY GEOGRAPHY LESSON NOTES.

1. Geography.[1]

To Teachers: Read the Preface of the Primary Geography, and then read the rest of the book, in order to get the general plan of the work.

Teachers who wish to gain fuller knowledge of the topics treated in the *Primary Geography* may derive help from the lessons on the same topics in the *Complete Geography*. Refer to the index of the latter. See first footnote on page 92 of the *Manual*.

Study each lesson and make it your own. No book of methods can take the place of *live thought*.

Find out what each lesson teaches. Make note of the facts that are to be brought out by the class.

Think how best to throw light on these facts, — whether by pictures, by short stories or by crayon sketches. Above all, *know your school district*. Be ever alert to direct pupils to objects that they can see or handle, — to hills, brooks, flowers, animals, people, etc.

Let each lesson grow out of the one preceding it.

[1] All number and title references in part II of this *Manual* are to pages and lessons in the *Primary Geography*. The letter *M* placed after figures (thus, page 9 *M*) refers to this *Manual*. *CG* refers to the *Complete Geography*.

Forge a chain of thought and each link will help to hold all others in memory.

The work of *making* a definition is of great value to pupils *when they have ideas to classify.* Such work then tends to vivify and to relate ideas.

Thoughtful teachers no longer treat pupils as if they were parrots to chatter words. The objects themselves are studied, and not their mere word-shells.

Each lesson contains a few words that are new to pupils. Make a list of such words, and be sure that pupils learn the sense in which each word is used, and also how to pronounce it.

Let overworked teachers bear in mind the fact that *each minute spent in preparing a lesson saves ten minutes in teaching it.*

The first lesson in the geography aims to interest pupils in the study and to give an inkling of its meaning.

Lead pupils to talk about parts of the *earth* that they have seen. Webs of spiders and cocoons of moths will give an idea of the work of silkworms. See *Arabs* and *camels* on pages 66 and 67. A sandy field will serve to illustrate *desert;* see also pages 49 and 52. Lead pupils to make a collection of spices; see page 80. Talk about the land of the *Eskimo* and *seal;* see pages 63 and 64. Flax, thistle or milkweed will help to teach *cotton.* See *mountains* on page 13.

Do not teach all the above in one lesson.

For pronunciation of names of places and of other words used in *Primary Geography*, see page 126. If pupils are to use the *Word List* they should be trained to pronounce the *key words.*

2. Hills and Valleys.

The purpose of this lesson is to lead pupils to look for hills and valleys near home.

Running water shows which way land slants.

How does a hill differ from a valley? This question does not call for definitions. Pupils can discover that on a hill the sides meet at the top, while in a valley they meet at the bottom; that a hill rises above the land near it, while a valley is lower than the land at its sides; that water runs away from hills, but into valleys, etc. A few simple questions will help to bring out these and other thoughts. Do not expect too much at first.

Pupils can draw hills and valleys on the blackboards. The *sand tables*, now in use in many schools, will help to illustrate this lesson.

3. Brooks and Rivers.

To show that the speed of streams depends mainly on the slant (or slope) of the land, and to teach the names *brook* and *river*.

Look for names in the pictures, page 2. Rain feeds these brooks. The water flows swiftly in the *rapids*, because the land is steep. Under the bridge the land is nearly level.

The brooks spread over the meadow, because there is a hollow in it. The water fills the hollow and makes a pond.

See pictures of rivers on pages 10, 11, 14, 49. See brooks on pages 5 and 12.

4. Slopes.

To teach the value of slopes in nature.

Talk about the slopes near your school, and then find pictures of slopes in this book. This text may be used for an oral reading lesson.

Pupils can discover that the pond in the meadow has already overflowed its banks. The water now runs off as fast as it flows in. In times of heavy rain the water may flow in faster than it can flow out. Then the pond will spread over more of the meadow.

The text does not state that all ponds and lakes are made by brooks and rivers.

What can pupils find in the picture?

5. Kinds of Soil.

To lead pupils to observe the kinds of soil in their district.

Use any kinds of soil. Let the pupils know that the water poured on the soil shows what becomes of rain.

Plants that decay help to form soil. If there is a grove near your school, the pupils may find *leaf mold* in it.

The most important part of this lesson is that of interesting pupils in collecting kinds of soil.

6. Work of Water.

To show that water washes away soil.

Try to teach this lesson on a rainy day. Lead pupils to talk about the picture. Notice the clear sky

above the clouds. The rain shows the direction in which the wind is blowing. The sun lights the tops of the clouds.

Have pupils seen washouts? Have they seen roads cut by rain?

Sand is too heavy for slow rills to move. Fine soil is lighter and is more easily carried.

FOOTNOTE. — **Weather Record.**

To train pupils to observe the weather.

This work lays a basis for the study of climate, and thus saves time in the higher grades. No part of the entire course is more important than the making of these records.

7. Loose Soil.

To show why soil around plants should be kept loose.

Let the pupils who try the experiments make a report to the class.

Frost cracks and crumbles soil.

8. Rain in the Soil.

To teach the work of water in soil.

Great interest can be aroused by trying some of the following experiments:

Put a few kernels of corn into a bottle of water, and see how soon they will sprout.

Sow a little grass or flax seed in a wet sponge.

Put two or three potatoes in a damp cellar to sprout.

Place a sweet potato in a glass of water and keep it in a warm room. It will make a beautiful vine.

Hollow out a common potato, being careful not to injure the "eyes"; fill it with wet soil, and plant in it an ivy or other vine.

Take good care of the plants and they will tell a wonderful story.

A box of ants will prove very instructive, and pupils will never grow weary of watching these little toilers. The box should have a glass cover. Put in a few crumbs of bread each day.

9. How Soil settles.

To lead the thought to the order in which soil or rocky matter settles in water.

The coarse and heavy matter settles first. The finest soil settles on top.

10. Work of the Brooks.

To show how brooks carry soil.

The rapids, of course, roll the pebbles. They wash down the sand, also. If there were no pond, the brook would carry the mud away and deposit it somewhere in still water.

11. Mud Banks or Deltas.

To show how deltas are made. *See lesson 17 CG*[1] *and notes on the same in this Manual.*

[1] *CG* refers to the *Complete Geography.*

The Greeks gave the name *delta* to the alluvial land at the mouth of the Nile, because this low land was shaped like the Greek letter (Δ) *delta*. The word *channel* is here used in the sense of a trough or cut in which water flows.

See maps of the Orinoco, Ganges and Nile deltas, on pages 32, 42 and 50.

It may be a good plan to turn to the maps on page 29, and show pupils the land and sea. No names for the parts of the sea are now needed.

On page 44 there is a picture of a village built in the delta of the Ganges.

12. Water and Heat.

To show the origin of clouds.

The word *vapor* is often loosely used in the sense of cloud, fog or smoke. In this book the word is used in its true scientific meaning. *Water vapor* is water in its gaseous state, and, as such, is invisible.

As the water in the bottle is heated, observe the bubbling or boiling. A tiny cloud can be seen coming from the bottle. The deposit of moisture on the cold glass will prove that the cloud contains water.

The cold window will show that the breath contains vapor of water. The water in the tin cup goes away as vapor in the air.

Pupils will readily answer that the cloud from the kettle is made by heating water. They may discover that the hot water changes into vapor, and that the vapor changes into this cloud.

Do not expect too much from pupils in this lesson. Let them see the experiments and tell what they see.

13. Forms of Water.

To lead pupils to observe forms of water.

This lesson should be made very simple. The question of dew-point, or of saturation, need not arise.

Tyndall uses the name *water-dust* for *cloud.*

Snow is now thought to be frozen vapor. When *vapor* freezes upon grass, stones, etc., it forms frost. True frost is not frozen dew.

Just before water freezes, it expands. Water at the freezing point is, therefore, lighter than that which is slightly warmer. The colder water rises and freezes over the warmer.

The meaning of the picture is plain. Just as the water in the kettle is changed by heat into vapor that forms a cloud, so the surface of the sea or of the lake is changed into vapor that, in turn, forms clouds. In all these cases, the vapor is in the clear space between the water and the cloud.

14. Springs.

To direct the thought to water coming out of the ground.

In some places, as in swamps, the soil is filled with water; but in many places the water finds its way to springs, and thus flows out of the ground.

Many brooks flow in dry seasons, because they are fed by springs. Raindrops may travel for months in soil before reaching a spring.

Note that a spring is not the "place where a stream starts," — it is the flowing water itself. The *issue of water* from the ground, or the beginning of the stream, and not the hole in the ground, is the spring.

15. Sources of Streams.

To show the various ways in which streams form.

It does not seem best to discuss fully at this time the sources of streams shown in the pictures. Brief mention of each kind will suffice. The larger book of the series gives more details.

One picture on page 7 shows the melting end of a glacier. See, also, the pictures on page 72.

Pupils may need assistance in understanding the picture of the glacier. The entire white mass, looking like a distant mountain chain, is the end of a great glacier. See the wide cave in the end of this glacier. A huge block of ice has recently fallen.

Page 53 shows other hot springs.

What can pupils discover in the pictures on page 7?

16. Where Brooks flow.

To teach that brooks follow slopes.

Brooks cannot flow uphill, and so they wind around the high places in their paths.

Every stream must flow downhill.

The speed of a stream depends largely on th slope of the land over which it flows, as well as o the volume of water.

Brooks spread out in low and level places.

17. Systems and Basins.

To prepare for the study of the basins and systems c the grand divisions.

The lower picture on page 8 shows two brook basin with their systems.

Show pupils the Mississippi basin on pages 3 and 105.

A basin is land; a system is water. A basin made of slopes, while a system is made of stream A system drains a basin.

Point out the great systems and basins on th map, page 32.

18. The Top of a Ridge.

To prepare for the study of *divides*[1] in the gra divisions.

A sand table would greatly aid in impressing th lesson. If there is a ridge near the school, refer to for all answers.

When rain falls on the top of the ridge, part of t water doubtless flows into each valley.

Each valley reaches to the top of this ridge and bounded by the line forming the valley-rim.

[1] See note on the word *divide*, page 111 *M.*

19. Divides.

The aim is the same as in lesson 18.

If possible, direct pupils to a divide near the school. One minute with nature is worth a day with a map.

Have you any pictures of divides?

Lead pupils to trace some of the divides on the map, page 32. Make clear the fact that water partings may be on low land as well as on high ranges.

ILLUSTRATIVE LESSON. — It may prove helpful to teachers to study this report of a lesson.

The aim is to teach how rain is gathered into streams. The teacher shows to the class a map like the one on this page, but made in actual relief on a sand table. This map is made of clay or of putty, and is covered with a thin layer of loam.

Water is *sprinkled* upon the map, and tiny streams form in the low places.

Teacher. — "In what direction does every brook flow?"

Pupils. — "It flows downhill."
"It follows the valley."
"It flows from the high places to the low ones."
"It runs down the steepest slopes."

Teacher. — "In what part of a valley should you look for a brook?"

Pupils. — "We should look in the lowest part."
"A brook is just between the slopes."
"It is where the slopes from both sides meet."

Teacher. — "How much land does a brook drain?"

Pupils. — "It drains a valley."
"It drains all the land that slopes toward it."
"Water flows from the sides of the hills into the brook."

Teacher (Sprinkling water upon the middle ridge). — "Into which valley does this water flow?"

Pupils. — "It flows into both."
"Part flows into each."

Teacher. — "Why does not all the water flow into one valley?"

Pupils. — "Because it can't flow uphill."
"It must flow down the slope."
"The land is too high between the valleys."

The teacher now points to many parts of the map, and asks to which valley each part belongs. The pupils answer readily until the finger rests upon the *divide*, and the class is in doubt.

Teacher. — "Can you find other places like this?"

Eager fingers then trace the divide between the valleys.

Teacher. — "To which valley does this line belong?"

Pupils. — "It does n't belong to either."
"It belongs to both."
"It is just between the valleys."
"Both valleys begin at this line."

Teacher. — "On which slope is this line?"

Pupils. — "It comes between the slopes."
"It is on both slopes."
"The slopes meet at this line."

Teacher. — "We will call this line a *divide*. Can you tell why?"

Pupils. — "Because it divides the land into two valleys."
"Because it divides the slopes."
"It turns the rain in two directions."

Teacher. — "Open your geographies at page 9. Point to a high divide that has snow upon it. Point to one on low hills. Can you find one on land that is nearly level?"

NOTES ON THE LESSON. — It had been carefully prepared. The teacher had a definite aim. The questions were direct and simple. The thinking was done by the pupils. Each question was answered in several ways, showing that pupils were allowed time for thought.

20. How Slopes are worn.

To lead pupils to think of the wasting away of land-masses.

Use any piece of wood that has begun to decay.

Nearly every pebble taken out of the soil shows decay. A shell of soft stone surrounds the hard nucleus. The outer part has begun to decay.

Pupils can find many pieces of rock in all stages of decay.

Look at the ground under the eaves of buildings, and see how the rain has worked.

The "rocky cliff" on page 17 has been cracked and crumbled by frost.

The canyon (or cañon) of the Colorado, page 38, and the gorge of Niagara, page 39, were made by running water.

21. Beds of Streams.

To show how streams wear their beds.

The Snake river in Idaho has worn away its bed in layers of lava and made beautiful falls. The cliff beyond the falls is made of lava and ashes.

This ice jam is in the Mississippi. The mud, sand and stones held by ice are left in the places where the ice melts.

The portion of Niagara river that is above the falls flows on hard limestone. Under this, there is a thick bed of soft stone (shale). The falling water easily wears out this shale, leaving the limestone overhanging the gorge. From time to time the limestone breaks off and falls into the gorge. The picture on page 39 shows pieces of fallen rock.

In the little cut of Minnehaha, pupils can see layers of rock back of the falls.

Stones in a river bed are rounded by being rubbed together. After a long time these stones will be ground to sand and mud. The rivers carry part of this rocky matter wherever they flow.

22. Valleys.

To show types of valley forms.

Do not forget that the district should be studied.

See pictures of valleys on pages 45 and 49. That on page 49 is a fine example of a transverse valley. It crosses a range.

One of the pictures on page 11 shows the Hayden valley, in Yellowstone Park. This will serve to illustrate a wide valley.

The canyon (or cañon) of the Colorado shows the cutting of a river in a dry region. The banks are steep, because there was not enough rain to wear them very far back while the river gouged its bed.

In the primary course it does not seem best to enter very far into the cause of shapes, but merely to show a variety. The teacher, however, may be interested to read lesson 16 *CG* and notes on the same in this *Manual.*

Pupils can bring to school many pictures of valleys.

Rain, streams and moist air cause the sides of valleys to waste away. The glacier melts as it reaches lower levels. See glaciers on pages 7 and 72.

The sand table will aid greatly in the study of valleys. Give several lessons on valleys.

23. Mountains.

To teach types of mountains.

The Cascade peak is made of tilted and folded rocks. Page 14 shows the Rhine valley, "long and deep," in a plateau. The Temples of the Virgin are merely fragments of a plateau. The sharp points standing near the "mesa" were once a part of the mesa or plateau.

Pico volcano shows plainly the cooled lava. The word from which *crater* is derived means a "dish for mixing," —a very apt name. It would interest pupils to tell them a story about Vulcan, the god of fire; see any good book of myths. The eruption of Vesuvius, burying Pompeii, forms a basis for a good story; see lesson 79 *CG*.

Pupils should see pictures of types of the low, rounded ranges, such as the Jura and Alleghany, as well as types of rocky ranges. Mt. Mitchell is a typical dome, and the range pictured above it may be taken as a type of low, rounded mountains. The flowers that show in the picture of Mt. Mitchell are the *royal rhododendron*, the glory of the southern Appalachian mountains. In places these flowers cover hundreds of acres.

See *crests* on pages 32, 35 and 45.

The soil on steep slopes is generally poor, because the finest part of it is washed away by rain.

Study the pictures on page 13. Give several lessons on mountains.

24. Plains.

To show some ways in which plains are formed. The teacher may receive help from lessons 17 and 18 *CG*, and from notes on the same in this *Manual.*

This Dakota grainfield is part of a vast plain that was at one time the bed of a lake. It is thought that on the north this lake was shut in by a mass of ice, near the close of the ice age.

In the state of Idaho alone there are about 12,000 square miles of lava plain, like that in the picture. The Shoshone falls, page 10, are in this lava region. The flow of lava must have come through long fissures or cracks.

The Rhine flood plain is made of soil brought down by the river. There are thousands of square miles of flood plain along the Mississippi and its branches.

See plains on pages 39, 82 and 92. The Colorado river, page 38, flows through a plateau.

Show pupils how low plains and plateaus are pictured on maps, pages 32 and 42.

Give several lessons on plains.

25. Shore Forms.

To compare the outlines of shore forms.

Collect many pictures of shore forms. These should show islands, capes, bays, etc., of many shapes and sizes. Have pupils draw some of these shapes.

As each form is taught, show one or more like it on a map.

Make one entire lesson on islands, another on peninsulas, etc.

It would be mere waste of time to search for differences between bays and gulfs or seas. Glance at the map, page 24, showing the bay of Bengal, the gulf of Guinea and the Arabian sea. Why should one be called a gulf and another a bay or a sea?

Pupils can doubtless bring many excellent pictures.

26. Work of Water on Shores.

To show how coastlines are shaped by water.

Gravel consists of small pebbles, and is often mixed with sand.

The stones on the shore near the clay cliff came from the cliff. Water washes the clay from under the stones and they fall.

The loose earth at the foot of the rocky cliff will in time be swept away by waves and tides.

The caves in the middle cliff were made by waves. Seaweed protects shores from the action of waves and rolling stones. A coat of seaweed helps to prevent frost from cracking the rocks.

The picture marked "Dunes" shows how sand has been drifted by winds.

The Stones of Stennis are ruins of an old Druid temple in Scotland. The shore around these stones is low and grassy. Grass prevents sand from drifting.

Deep water is needed in harbors, in order to float large ships. High shores help to shut out strong winds.

As a rule the best harbors are on rocky coasts. Harbors on sandy coasts are apt to be shallow and easily swept by gales.

Spend three or four days on this lesson.

27. Points of the Compass.

To teach directions.

Pupils can readily be led to discover that the sun does not always rise in the same place, but that it rises in or near the east. The sun is in the south at midday, and at that time casts the shortest shadows. Make the definite midday shadow the starting-point for teaching directions.

Can pupils *discover* the difference in time between the *midday* and the noon of railroad time?

Pupils should become familiar with the directions indicated by letters around the compass on page 18.

28. How Maps are made.

To show pupils how to draw to a scale.

No teacher will make the mistake of having pupils copy the plans shown in this lesson. These plans are intended to show pupils what parts of their own schoolroom, house, yard and district they should draw.

29. Reading Maps.

To show pupils how to read the outline maps in their geographies.

A series of maps leading out from the pupils' own school district would prove more helpful than this series.

The class can make original maps of the parts of the district with which they are familiar.

Be sure that the pupils know what the lines on the maps represent. Each sign on a map is like a word in a sentence. There must be ideas behind the signs or there can be no thought. Map signs, like words, are of no use unless they help to relate ideas.

On page 101 there is a picture of a New York water front.

30. Form and Size of the Earth.

To give some idea of the form and great size of the earth.

"If an ant were placed on a large balloon, do you think that to the tiny creature the balloon would look round?" This question may awaken thought on the part of pupils.

Cut a very small round hole in a piece of cardboard and place it against a globe so that a small part of the surface of the globe will appear in the hole. This part will look level.

A common illustration is that of a train going 25,000 miles. Such a trip would take more than a month.

The rings on the moon are thought to be craters.

Beginning with this lesson the topical plan of study and recitation should perhaps be often used; see pages 10-13 *M.*

TOPICS: Horizon, moon, form of earth, size of earth, what the pictures show.

31. What a Hill is made of.

To direct the thought to what is beneath the surface of the earth.

Lead the pupils to the thought that rocks are sometimes covered with clay, sand or water, as well as with gravel.

The water in the picture flows upon rock. Streams flow also, of course, upon clay, gravel or fine soil.

By shaking pieces of sharp rock in a bottle, pupils have found that sand consists of little grains of rock.

If there is no clay in the school district, omit the question, "What is clay?" Pupils are not expected to tell the composition of clay, but merely to tell some of its properties: when wet, it is sticky; when molded or pressed, it readily retains its shape; when baked, it becomes very hard.

TOPICS: The answers of pupils to the questions will be very simple and may take the place of topics.

32. What the Earth is made of.

To teach what the earth is made of.

On page 29 there are four maps of the earth. On these globes the mountains are greatly exaggerated, in order that the slopes from them may be plainly seen.

It is not known whether the interior of the earth is in a liquid or in a solid state. The ball of rock may be solid to the center.

TOPICS: What the earth is made of, the land, soil, water surface.

33. The Air.

To make pupils conscious of the presence of air all about them.

It is the air, of course, that offers resistance to the falling paper.

Pure air cannot be seen, at least in small quantities. The blue color of a clear sky is largely due to the presence of dust motes.

We can feel air when in motion.

TOPICS: The questions will answer the purpose of topics.

34. The Shell of Air.

To direct the thought to the earth in its shell of air.

In how many ways can pupils prove that there is air about them? Let pupils discuss these questions: "Is the air of greater use when calm or when in motion? When warm or when cold?"

TOPICS: Uses of air, height of air, the air shell.

35. The Poles.

To teach directions on the globe.

Guard against the thought that there is a line drawn through the earth or that there are pegs at the poles.

Try tossing a ball into the air and discovering the direction in which its axis points when turning.

Pupils will be greatly interested in meeting the teacher some evening to look for the pointers and the north star.

It does not seem necessary to direct the attention of pupils to the fact that the north star is not exactly in line with the earth's axis, or that the axis itself is very slowly changing its position. The motion is so slow that its effect is not felt in a lifetime.

Impress upon pupils that north is toward the north pole. When they can tell the directions in which all the arrows on page 23 are flying, there will be no difficulty in reading directions on all the maps in the geography.

TOPICS: Axis, poles, north star, polar regions, north and south; study questions in small type.

36. The Equator.

This lesson continues the work of the preceding.

Find the equator on each of the maps on page 23. Give thorough drill in reading the directions in which the arrows on the maps fly.

Hold a ball in the sun, and see what part is lighted by the direct rays.

At the close of this lesson turn to the colored maps on pages 105 to 115, and find on them north, south, east and west.

Review often the work outlined on page 23.

TOPICS: Equator, seasons near equator, east and west, motion of earth on its axis; study questions in small type.

37. The World Ridge.[1]

To teach the simple unity in the world's great highlands.

A small globe in the hands of each pupil would prove of great value. There should be at least one globe in the schoolroom.

Opposite each large relief map there is a small *key map*, giving names that occur in the text. Other names can be found on the colored maps, pages 105 to 115. Show the pupils how to use the key maps.

Train pupils to read maps. What can they read from the map on page 24? They can find the north pole and the equator (see page 23); they can tell which lines run north, south, east or west; they can point to the land and to the sea; they can find the great plains and the plateaus; they can show where the highest divides run, and where the great streams flow. Give the pupils a chance, and they may surprise the teacher with their skill in reading maps.

By turning the book to right and left, it will be seen that each grand division is but slightly distorted. This is, doubtless, the most accurate projection for making a map of the land areas.

We may speak of the north pole as being not far from the middle of the world ridge.

TOPICS: World ridge; study questions in small type.

[1] See notes of lesson 5, page 97 *M.*

38. Andes Highland.

From this time on do not let the pupils lose sight of the unity of the globe relief. As each new form is studied, show its position on the relief map on page 24.

On page 31 there is a picture of a condor in the Andes. See also map on page 32.

This lesson brings us to the first of a series of short stories. These are to help fix in mind the leading facts of the lessons. The stories are to be read, but need not be closely studied. For notes concerning text in small type, see page 17 *M.*

TOPICS: Andes highland, llama.

39. Rocky Mountain Highland.

Look for this highland on the relief map of the globe, page 24.

Pupils can easily see that the Andes highland is higher but narrower than the Rocky Mountain highland.

There are pictures of parts of the Rocky mountains on pages 12 and 35. See map on page 36.

TOPICS: Rocky Mountain highland, Rocky mountains, crossing the Rockies.

40. Highland of Tibet.

See picture on page 41, and map on page 42.

The longest plains of Asia are north of Tibet.

TOPICS: Highland of Tibet, musk deer.

41. Highland of Abyssinia.

From Asia the world range extends into Africa. A spur from this great ridge enters Europe, but no part of the divide between the great ocean basins enters that grand division.

The two ends of the world ridge are at Cape Horn and Good Hope.

See map on page 50.

TOPICS: Highland of Abyssinia, climbing Kilima-Njaro.

42. Slopes from the World Ridge.

The Atlantic slopes are on the inner side of the world ridge. The Pacific slopes are on the outer side.

Have pupils show on the map, page 24, the long and short slopes from each of the four great highlands in the world ridge.

TOPICS: The long slopes, the short slopes.

43. Selvas.

On page 33 there is a scene in the selvas.

The picture on page 27 shows natives without clothing. From this picture pupils can readily judge that the air of the selvas is warm.

Skill in reading pictures is of far greater value than mere memory of the text.

TOPICS: Selvas, Indians of selvas.

44. Western Plains.

There is a picture of a grain field on page 82, and of a cotton field on page 92.

The prairies are plains, but they do not form part of the Western plains.

See map on page 36.

TOPICS: Slopes east of Rockies, Western plains.

45. Tundras.

On page 41 there is a scene on the tundras.

The animals on page 43 live in great forests that grow on the plains north of Tibet.

The word *tundras* appears on the key map, page 25, and also on page 43.

TOPICS: Tundras, reindeer, region south of tundras.

46. Desert of Sahara.

On pages 49, 52 and 112 there are pictures of parts of the Sahara.

Some parts of this desert are covered with rocks, and other parts with parched soil.

See map on page 50.

TOPICS: Describe pictures on pages 49 and 52, region south of desert.

47. The Grand Divisions.

The names used in this lesson appear on the maps of the hemispheres, page 28. Have pupils show the

grand divisions on the little globes pictured on pages 28 and 29.

See, also, map on page 24.

TOPICS: The questions may take the place of topics.

48. The Oceans.

Follow the suggestions given under lesson 47.

Page 78 shows a junk on the Pacific. On page 64 there is an Arctic scene. There is an Atlantic steamship on page 100.

The Pacific is the largest ocean. The Atlantic is next in size.

TOPICS: If the questions are studied, no topics will be needed.

49. The Bottom of the Sea.

Lead pupils to think of a coastline as the line where the land slopes under the sea. This line shows how far water rises on the slopes of the grand divisions.

The land is being constantly worn by streams and waves, while the sea is ever spreading material evenly over its bottom. The work on the land consists largely of tearing down. The work in the deep sea is that of building. Thus we see why the bottom of the sea is not cut and gullied like the surface of the land.

Bring out the thought that the characteristic appearance of the sea bottom is that of a vast smooth plain.

There are broad plateaus under the sea, but they have not the appearance of land plateaus that have been worn by rain.

Dwell upon the darkness of the deep sea and its coldness. Look for pictures of fish peculiar to deep sea.

The shores of the grand divisions are the feeding grounds of many of the best food fishes. Waves churn and help to grind sea plants, and thus prepare food for fish.

TOPICS: Surface of sea-bottom, sunlight in the sea, fish.

50. Coral Islands.

Encourage pupils to collect specimens of coral. Look for pictures of other coral islands.

On pages 80 and 81 there are pictures and descriptions of breadfruit, cocoanut and banana. These are the chief food plants on many coral islands.

This lesson illustrates the grinding power of waves. It also shows what becomes of part of the land waste.

TOPICS: How a coral forest grows, work of waves with coral, how seeds are borne about, reefs.

51. Surface of South America.

Many teachers may prefer to place lesson 52 before lesson 51.

Refer constantly to the map on page 24.

Lesson 38 states that the Andes highland reaches one fifth of the distance round the earth.

The lofty plateau near the bend in the Pacific coast s that of Bolivia. Notice that the *lake* is two miles and a half above sea level. The border ranges rise much higher.

Study the pictures above this lesson.

On page 120 there is a map that will serve as a guide for modeling and drawing. Many teachers prefer not to have pupils model the grand divisions in the primary course. Pupils can readily learn to sketch these maps. Large maps modeled in sand by teachers are of great assistance.

TOPICS: Cape Horn, Andes highland, Lake Titicaca, where the equator crosses, volcanoes, isthmus of Panama, selvas, Lima and Rio Janeiro.

52. Map Studies.

This lesson is one of a series of map studies. See also lessons 58, 68, 74, 80 and 85. These questions are so graded that when pupils reach lesson 85 they should know how to read a map without assistance.

Teachers should not lose sight of this *growing power to read maps*, for it is worth much to pupils. It is earnestly hoped that teachers will study the *grading* of map questions in the lessons cited above.

Pupils will readily answer that the middle part of the Andes highland looks widest and highest.

On the west slope of the Andes there are no long rivers, because the slope is steep and short.

Train pupils to use the key maps.

The picture of the globe on page 33 is one of

series intended to keep *comparative sizes* and *relative positions* before the eyes of the pupils. These globes show the relative positions of both land and water areas. Ask questions leading pupils to study the globes. In addition to South America the globe on page 33 shows parts of three other grand divisions and of four oceans. These furnish a "setting" for South America.

53. Amazon River.

The pictures on page 84 show some of the animals of the Amazon valley.

The lily in the picture on page 33 is the *Victoria regia*. The stork is standing on a lily leaf. Note how the edges of the leaf are turned up.

What can pupils find in this picture?

TOPICS: Amazon river, plants, animals.

54. Highland of Brazil.

Use the maps on pages 24 and 32.

A great deal of Brazilian coffee goes under other foreign names. More than three fourths of the coffee used in this country are raised in Brazil. Comparatively little comes to the United States from Java.

This story teaches that the climate of Brazil is warm and moist.

Notice the blossoms and berries together on a sprig of coffee. This growth is characteristic of the coffee tree.

TOPICS: Highland of Brazil, where and how high; coffee.

55. Pampas.

The general slope of the La Plata basin is towards the south.

Custom sanctions the expression, "the La Plata," although *la* means *the*. Rio de la Plata means *river of silver*.

The basin of the Amazon is about twice as large as that of the La Plata. See tables of statistics, page 119. A part of the highland of Brazil divides these basins.

TOPICS: Answer questions, surface and soil of pampas, pampas grass, products, Orinoco valley.

56. Isthmus of Panama.

The straw huts in the picture belong to the poorer class of people. These people dress mainly in cotton cloth.

Many donkeys or *burros* are used on the isthmus. On page 37 there is a picture of one of these small animals.

TOPICS: The isthmus, railroad.

57. Surface of North America.

Study lesson 58 before lesson 57.

Use the maps on pages 24 and 36.

The *ranges* rise much more than a mile and a half above sea level.

Help the pupils locate the pictures of this group.

Nantasket is near Boston; Ottertail range is part

of the Rocky mountains in Canada, not far from the United States border.

These bison are a remnant of the vast herds that once roamed over the Western plains. The picture shows a small herd now kept in a park in Manitoba, Canada.

TOPICS: Plateau of Mexico, southeast of Plateau of Mexico, Great Basin, Great Salt lake, world ridge north of Great Basin, Yukon river.

58. Map Studies.

Notice that these map questions do not help pupils so much as those under South America.

Pupils can show on the map, page 24, what part of the world ridge is in North America.

It will be interesting to note what the relief map tells your pupils. Will they see that the great highland is on the west side; that there is a small highland along the Atlantic coast; that between these highlands stretches a vast plain; that the coastline is more broken on the north and east than on the west; that the longest rivers are east of the great highland? Teachers may need to ask a few guiding questions, but let pupils do all they can without such help.

The little globe on page 37 shows the position of North America relative to four other grand divisions and three oceans. Lead pupils to see these relations.

Compare the two globes on pages 33 and 37, and tell which is the larger, South America or North America. See tables of statistics on page 118.

These Mexican children live in straw huts, and dress in cotton cloth. Their dress shows that the air is warm.

See model map on page 121.

59. The Rocky Mountains.

The aim of this story is to lead pupils to think of steep and rugged slopes among the Rocky mountains, and of the difficulties of travel in this region.

The donkey or burro, with his load, will form a good subject for a language lesson.

Pikes peak is not far from the city of Denver. See map, page 105.

Formerly the name was spelled Pike's, but by a ruling of the United States Board on Geographic Names (Report of 1892) the apostrophe was dropped from this and all similar names *in the United States*, such as St. Marys river, Longs peak, Marthas Vineyard.

60. Colorado Cañon.

The answers to the questions can be found on the key map, page 37.

The "Cañon in Arizona" is a characteristic picture of the region south of the Colorado river.

TOPICS: Questions, Colorado river and canyon (or cañon).

61. The Height of Land.

The word *Height* may convey a wrong impression to pupils. The grain field on page 14 is near this Height, and many fields like this are on the Height of Land.

The Welland canal joins Lake Erie with Lake Ontario. The change in level between these lakes is about 300 feet.

TOPICS: Questions, Height of Land, Great Lakes, Niagara river and falls, canal (Welland) between lakes Erie and Ontario.

62. The Mississippi Basin.

The Mississippi basin is roughly bounded as follows: On the west by the Rocky mountains, on the north by the Height of Land and a low swell that runs south of the Great Lakes, and on the east by the Appalachian highland.

TOPICS: Questions, prairies, southern plains, western plains.

63. North of the Height of Land.

In this primary course it does not seem desirable to spend much time studying the region north of the Height of Land.

TOPICS: Hudson bay, Nelson and Mackenzie rivers, region northwest of Great Lakes.

64. Appalachian Highland.

Refer to the relief map on page 36.

TOPICS: Appalachian highland, — where and describe.

65. Atlantic Slope.

Use the relief map of North America, page 36.

TOPICS: Rivers of Atlantic slope, Hudson river, New York.

66. Pacific Slope.

Do not forget to use the relief map on page 36.

TOPICS: Slopes west of the Sierra Nevada and Cascade range, Coast range, fruits near southern end of Sierra Nevada, Pacific slope.

67. Surface of Asia.

Lesson 68 may precede this.

See tables of statistics on page 118. Refer to the map on pages 24 and 42.

Study the picture on page 41. Mt. Dunkia is in the Himalayas, north of Calcutta. This peak is about four miles and a half in height.

The natives in the picture of the tundras are Samoyedes. They belong to the yellow race.

TOPICS: Size of Asia, highland of Tibet, Himalaya mountains, Mt. Everest, slopes from Tibet.

68. Map Studies.

Study the maps on pages 24 and 43.

The longest slope is north of Tibet.

For *directions*, refer to maps on page 23.

What grand divisions appear on the little globe on page 43?

The model map of Asia is on page 122.

69. Arctic Slope.

Refer constantly to the map on page 42.

TOPICS: Longest slope of Asia, Arctic coast, tundras, animals of Arctic slope.

70. Caspian Basin.

Locate on the relief map of Asia, page 43.

TOPICS: Questions, steppes, Caspian sea.

71. Plains of China.

Do not overlook the use of the relief map of Asia.

TOPICS: Slopes from Tibet, plains of China, tea.

72. The Ganges Basin.

Pupils should refer to the relief map of Asia.

TOPICS: Slopes of the Ganges basin, Ganges river, bamboo.

73. Surface of Europe.

Study lesson 74 before 73.

Use the map on page 24.

On page 13 there are two views of the Alps — Mt. Blanc and the peaks near Les Près, France. Mt. Blanc is in France.

The highest peak in Europe is Elbruz, in the Caucasus range.

Study the pictures on page 45. The Rhine view shows the famous vineyards opposite Bingen. At the top of the bluff, or palisade, may be seen the great Germania monument.

This is the Viesch glacier. The medial moraine is very clearly shown.

TOPICS: High Europe, Low Europe, Swiss plateau, Alps, Black sea, Bosporus, Constantinople.

74. Map Studies.

Are pupils learning to *read maps?* Ask guiding questions, if necessary.

Europe is on the inner side of the world ridge.

What grand divisions and oceans are shown on the globe, page 47? Compare the area of Europe with that of each of the other grand divisions studied. See little globes.

The model map of Europe is on page 123.

75. Slopes from the Swiss Highland.

Make constant use of the relief map of Europe, page 46.

TOPICS: Slopes around Swiss highland, questions, Gibraltar.

76. Valdai Hills.

Locate on the map every feature named in the text of the lesson.

TOPICS: Questions, Volga river, Volga basin, canals of Low Europe.

77. The Caspian Basin.

TOPICS: Caspian sea, sturgeon fishing.

78. British Isles.

Refer to the maps on pages 46 and 109.

TOPICS: Locate British Isles, trade, Ben-Nevis.

79. Surface of Africa.

Lesson 80 should precede 79.

Study the pictures. The Nile view shows the landing place at Assouan; see map, page 113. Several caravan routes lead to this place, because there are no cataracts in the river below.

The scene in the Atlas mountains shows a Moorish town, and a fine example of a valley worn through a mountain range.

TOPICS: World ridge in Africa, surface of Africa, Abyssinia, Nile basin, Kongo basin, desert of Sahara, Atlas mountains.

80. Map Studies.

Do not neglect the world ridge map, page 24.

Can pupils read the relief map of Africa without assistance?

Have pupils learned how to read the little globes? What can they read on the globe-map, page 51?

The Suez canal has no locks. This great ditch is about one hundred miles in length.

The model map of Africa is on page 124.

81. The River Nile.

Use the relief map on page 50.

TOPICS: Questions, Nile overflow, lower Nile, how soil is supplied.

82. Oasis in the Desert of Sahara.

Do not overlook the constant map reference.

TOPICS: Questions, desert springs, dates, desert of Sahara.

83. Kongo Basin.

TOPICS: Kongo basin, Kongo river, end of world ridge, Cape Town.

84. Surface of Australia.

Study lesson 85 before 84.

The position of Australia, relative to the world ridge, is shown on the key map, page 25. See also map on page 73. This grand division is on the outer side of the great ridge.

New Zealand is shown on the map, page 115. Find the Blue mountains, also, on this map.

The tree ferns in the picture give a hint of the great ferns of the coal period.

These hot springs of New Zealand are known as the "white terraces."

TOPICS: Area, surface, Murray river, New Zealand, kangaroo, Australians.

85. Map Studies.

Read the relief map of Australia, and then read the little globe on page 54.

The model map of Australia is on page 125.

Lessons 86 to 94.

The aim of these lessons is to interest pupils in the study of the races, and to give some knowledge of the home life of people in other lands.

The stories deal with race characteristics. Incidentally, they introduce facts concerning the climate, plants and animals of these lands.

The pictures should be studied very carefully. At the end of each lesson a few questions are asked. They are answered in the text or in the pictures, and may take the place of topics.

The last question under lesson 90 aims to bring out the thought that the clothing of each race is best suited to the climate and habits of that particular race.

Locate on the map, page 73, the scene of each lesson.

95. Homes of the Races.

Study the natural boundaries of races in the Old World. Note that high chains of mountains separate the yellow and white races in Asia. Nearly all Europe belongs to the white race. Roughly speaking, the desert of Sahara divides the lands of the white and the black races in Africa.

The Malays are chiefly an island people.

The Eskimos are classed with the yellow race. People of the black race are scattered along the warm coasts of America. About one tenth of the people in the United States are Negroes.

There are only about 250,000 Indians in the United States, but the number of people of this race in Mexico, Central America and South America runs far into millions.

TOPICS: Locate the home of the black race, red race, brown race, yellow race, white race.

96. Homes of the Nations.

Use this lesson for oral reading. It does not need close study.

A nation is a large family.

Can the teacher name a country that is not wholly or in part bounded by natural features?

With slight changes the story in this lesson would apply equally well to the Indians of America, to the Negroes in Africa, or to any other race.

97. Map Studies.

These map studies are placed here for the convenience of teachers that wish to include in this part of the course the study of location of countries.

Some teachers will select from the questions those that call for the location of leading countries only. Such a list would doubtless include those named on page vii of the Table of Contents.

Many teachers will doubtless omit this entire lesson.

98. Home Lesson for a Hot Day.

In some places teachers can take their pupils out into the fields to study this lesson.

Encourage as many as possible to try the experiments.

99. How the Air is heated.

Pupils that try the experiments named in lesson 98 will learn most from lesson 99.

It is thought that the sun's rays pass through pure air without heating it.

The leading thought of this lesson is this: The sun's rays do not heat the air directly, but the surface of the earth changes the sun's rays to heat, and gives the heat to the air. Clouds and dust help to perform the same work.

No topics are needed, as the lesson may be used for oral reading.

100. How the Earth is heated.

Pupils should be led to observe the varying path of the sun. Such work would prove of far greater value to them than would any text that could be written.

Take for a problem the question: *At what time of year does the sun shine the shortest distance into a room at midday?*

If your schoolroom has no south window, try the experiment *regularly* at any hour of the day when the sun enters an east or a west window.

Once a week at the appointed hour mark on the floor the inner edge of the sunlight. This may be done by driving small tacks into the floor.

Suppose that the record is begun in early autumn. Week after week pupils can discover that the sun runs lower and lower, for its light reaches farther into the room. At length, in the latter part of December, it remains the same for a few days. Then the path of light becomes shorter, and we know that the sun is rising higher and higher in the sky. In June the sunlight reaches the same point for several days, and then the shadows of objects begin to lengthen.

The answer to our question is: *The latter part of June.* This answer is of very little consequence, unless pupils have been led to observe the changes taking place in nature during the passing seasons. They can discover that the path of the sun determines each season, and this fact is the key to the study of how the earth is heated.

Mark the shadows and study the seasons, and pupils will easily comprehend the lessons on belts of heat.

If the above work is done, the text of this lesson need not be studied.

Lessons 101 to 104.

These lessons need occupy but little time. Most teachers will doubtless prefer not to try to explain in this primary course the relation of the earth's revolution on a fixed axis to the changes of season. It would seem better to leave that philosophy for the more mature minds to grapple.

Keep the work in these lessons very simple. Use the text for oral reading and discussion. Use a globe to illustrate briefly lesson 103.

These lessons do not need topical study.

105. Belts of Heat.

For the convenience of teachers that wish to include in this course the study of the zones of light, a lesson has been added on page 125.

The map on page 24 shows what river basins are crossed by the equator.

The rivers that flow into the Arctic ocean are those that drain most of the northern parts of Asia, Europe and North America. Pupils do not yet know the names of these rivers.

Pupils need not study the exact bounds of the heat belts. It will be sufficient if they learn which of the large river basins are wholly or in part in the various belts. The questions in the lesson will serve to direct this study.

In the larger book of this series the lines of heat will be studied. The aim of this lesson is to prepare the way for the study of plant belts.

TOPICS: Questions, seasons of hot belt, of warm belts, of cool belts, of northern cold belt.

106. The Trade Winds.

Within a few years many of the theories relating to causes of winds have been set aside. Ferrel's work has placed this study on a new footing.

Pupils can easily be led to discover the principle of motion resulting from difference in pressure or "weight," but the application of this principle and of Ferrel's theory of the effect of the earth's rotation seems to be far beyond the grasp of primary pupils. The difficulty will be evident to teachers that are familiar with *Davis' Elementary Meteorology* or with *Ferrel's Popular Treatise on the Winds.*

It may not be amiss to caution teachers not to overlook the fact that the polar regions are areas of *low* pressure, and that the tropics of Cancer and Capricorn are in or near belts of very *high* pressure.

Lesson 106, in the *Primary Geography*, gives a simple outline of the more important winds, and most teachers will doubtless be content not to press the subject further, in the primary grades.

TOPICS: Trade winds, winds of the warm and the cool belts.

107. The Gulf Stream.

The causes of ocean currents and their general plan of circulation are clearly not within the scope of this book. It has been thought best, however, to treat of two great currents, because of their influence upon the climate of important countries.

Find on the maps all places mentioned in this lesson. Lesson 72 describes bamboo. Many fishing rods are made of this plant.

TOPICS: Ocean currents, Gulf stream, effect on winds, story of the junk.

108. Where Plants grow.

The tufts on thistle seeds enable the wind to scatter them about.

Seeds that float may be carried to other places by streams or by the sea.

Teachers will need to modify the questions in this lesson to suit the locality. Ask many questions concerning plants that grow near the schoolhouse. The purpose is not to obtain *answers*, but it is to awaken and direct the thought to conditions of plant life.

109. Soil, Water and Heat.

The experiments suggested under lesson 8 will throw light on this lesson. The aim is to direct the thought to the relation of plants to soil, water and heat. This will help pupils to understand the distribution of plants in belts and regions.

Use this lesson for oral reading; no topics are necessary.

110. Plants of the Hot Belt.

Study the pictures under this lesson. See also the *Hot Belt* on page 81, and the pictures on pages 23, 33 and 34.

How many kinds of spice can the pupils bring for a school cabinet?

TOPICS: Questions, locate hot belt, seasons, banana, breadfruit, cocoanut, spices.

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TOPICS: Questions, locate hot belt, seasons, banana, breadfruit, cocoanut, spices.

111. Plants of the Warm Belts.

See the pictures on pages 40, 44 and 92.

Interesting language lessons may be given on the products of these belts.

Refer often to map on page 77.

TOPICS: Locate, seasons, principal plants.

112. Plants of the Cool Belts.

Find on the map, page 77, the cool belt of the south. A glance will show that it is scarcely worth notice.

See pictures on pages 39, 81, 93, 94 and 95. Refer to map on page 77.

TOPICS: Locate, seasons, products.

113. Plants of the Cold Belt.

The cold belt of the south calls for but slight notice.

See pictures on pages 63, 64 and 81.

For the food of the reindeer, see page 62.

TOPICS: Locate, seasons, plants.

114. Uses of Plants.

The questions in this lesson may supply topics for oral or written language lessons.

115. Animals. — Their Teeth, etc.

The aim of this lesson is to show how animals are fitted to their habitats or native haunts. Study a few of the common animals and discover their peculiarities.

Note their habits, and discover the relation of their structure to these habits.

The pictures on page 83 may suggest a line of study.

116. Animals and Their Homes.

The text of this lesson touches upon the structure of animals, their means of defense, and barriers to their dispersal.

Pupils can doubtless give many other illustrations of each of these topics. The pictures on pages 84 and 85 will suggest many interesting stories along the line of the lesson.

This lesson may be used for oral reading; no topics are needed.

117. Animals of the Heat Belts.

In this primary book the animals are not grouped in regions marked out by physical features. The faunal regions are studied in the larger book of the series.

Lesson 117 aims at showing the distribution of a few of the largest and most familiar animals. Notice the coastlines in the picture.

TOPICS: All questions in the text.

118. Uses of Animals.

Use the questions for oral or written language lessons.

119. Surface of the United States.

Review thoroughly the surface of the United States. See relief map on page 36.

A large part of Alaska is in the cold belt. This accounts for the word "mainly" in the sentence: "The northern part (of the United States) is *mainly* in the cool belt."

TOPICS: Questions, locate United States, coast of United States.

120. People.

TOPICS: Columbus, why Atlantic coast was settled, prairies, Pacific coast, questions, Negroes, Indians.

121. July 4, 1776.

Use this lesson for oral reading, then review by topics.

In connection with the lesson it would be well to read several short stories of the Revolution and the causes leading to that struggle.

TOPICS: Colonists, July 4, United States of America, City of Washington, capital.

Lessons 122 and 123.

In lessons 122 and 123 particular attention should be paid to the pronunciation of names. If pupils are to use this word list, they should first receive thorough drill in pronouncing the *key words* at the bottom of the page. Most teachers will doubtless pronounce the geographical names for the pupils.

The spelling of new names should be taught at once by *writing* them.

Lessons 124 to 131.

These lessons treat of the leading industries of the nation. The maps are based on government reports.

The darkest tint on each map shows the region of greatest production. The aim should be to fix in mind the regions whose products affect commerce.

Refer often to the relief map on page 36.

Collect pictures that illustrate these great industries. In this work pictures are of far greater value than any text that can be written.

Ask pupils to bring specimens of products, and use them in giving the lessons.

These lessons need constant reviews, in order to fix in mind the leading facts.

TOPICS: Questions (if any), locate the region, what heat belts cross it, the products, centers of trade or cities.

132. Routes of Trade.

Use this lesson for oral reading, then let pupils discuss the topics at the end of these notes.

Study the pictures. The steamship plies between New York and Liverpool. This freight train is crossing the Rocky Mountain highland. See the snow beside the tracks.

The canal boats are in the Erie canal. The caravan has brought merchandise to a shipping point on the river Nile.

Some teachers may think best to teach a few of the trunk lines of railroad across the United States.

TOPICS: Need of commerce, highways of trade, cheapness of land and water routes, centers of trade.

Lessons 133 to 139.

Thorough study should be made of the great commercial centers of the United States. Look for pictures that illustrate these cities.

Search for the causes of each city's growth. This work will call for constant reference to the series of production maps on pages 92 to 99.

Locate each city on the map, pages 90 and 91.

In this primary course it may be well to omit the list of cities named in the second column of page 103, or at least those below Minneapolis.

TOPICS: Where, advantages, products handled, routes of trade.

Lessons 140 to 155.

These lessons aim to present the industrial and commercial life of the countries that bear the closest relation to the United States. Train pupils to read the political maps.

The question of how to deal with pupils who are to leave school at an early age is one that faces every teacher. We must give them the training that will best fit them for the battle of life; at the same time we must deal justly with the *far greater number* of pupils who will continue the school work beyond the primary grades.

It is thought that a broad survey of the surface-features, climate, life, industries, leading countries, chief centers of trade, etc., will prove of far greater benefit than the *detailed* knowledge of the *political geography* of any country or group of countries. The former plan lays a broad basis for all future reading; the latter simply crowds the memory with unrelated facts which are soon forgotten.

Does the teacher wish to test the accuracy of the above statement? If so, let her select from the class such pupils as will not have the opportunity to study an advanced geography, and direct them to prepare lessons on countries *not* named in lessons 140 to 155. For each country use the following topics: Locate, surface, people, heat belt, plants of this belt, large animals, principal cities.

Tell the pupils which countries to study. Take *Russia* for example. As this work is to follow the completion of the *Primary Geography*, the pupils are familiar with the use of maps. They can readily locate Russia on the map of Europe, page 109. Next, turning to the relief map on page 46, they can describe the surface and drainage. The map on page 73 shows that most of the Russians belong to the white race, but that the yellow people dwell in the northern part. Turning to page 77, the map shows that Russia is in the northern *cool belt*. The pupils have already learned (lesson 112) that in this belt the "hot and cold seasons are about equal in length. The chief product are grains. The best grazing lands are in the cool belt. Here are also the largest forests of soft woods," etc. The

Turn to the index[1] of the *Complete Geography* and find out what pages in the book contain pictures of the articles named in this lesson. These will give a foretaste of the pleasures of the study.

Be sure to use the pictures that appear on the page with the text. They will greatly add to the interest. Thus, the text refers to the Lapps, and here is a picture to show the Lapp boy and man, their home and their reindeer. The polar scene carries the class to the home of the Eskimo. For another part of the text, here stands a Japanese girl with a baby on her back, and with tea leaves and blossoms thrown around the picture. On the right of the page are camels resting near tall date palms in the desert, while on the other side is a Nile water boy whose home is on the bank of the great river that flows through the desert. Perhaps the pupils can find at home other pictures bearing on the lesson. *Every pupil who contributes something will be interested.*

1. Form and Size of the Earth.[2]

This lesson gives a general view of the earth.

Every school should have at least one globe, even if only one of the 25-cent globes now so common. The

[1] The first editions of the *Complete Geography* did not contain an index. Upon application to the publishers, copies of the index will be supplied *free*. Insert the index after the *Table of Contents*, by pasting the folded edge of the sheet firmly in the book. This index will be found very helpful both to teachers and to pupils. When writing to the publishers, specify the number of books needing the index.

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III. COMPLETE GEOGRAPHY LESSON NOTES.

INTRODUCTION.[1]

THE first lesson in a new book leaves on the minds of pupils a deep impress for or against the subject treated. Let the aim of this lesson on page 1 *CG*[1] be to create an interest which future lessons may foster.

The interest of young pupils, and of many old ones too, centers in the *uses* of things. Let them therefore approach the study of geography by learning how *useful* the subject will be to them, — how it enters into their daily life and relates to their homes, their food, their clothing, their games, their books, etc. *Let interest be the keynote!*

This lesson is not to be studied, but is simply to be read aloud and talked over. The sentences bristle with questions. Thus, corn and wheat are mentioned; what uses do we make of them? What other useful grains do we use? Which grow near our homes? Cattle, sheep, cotton, lumber, coal, — every pupil knows something about their uses and will be glad to talk about them.

[1] The titles and numbers of lessons in part II of this manual correspond with those in the *Complete Geography*. The letter *M* placed after any page number (thus, page 38 *M*) refers to this *Manual;* 24 *CG* refers to the *Complete Geography*.

Turn to the index[1] of the *Complete Geography* and find out what pages in the book contain pictures of the articles named in this lesson. These will give a foretaste of the pleasures of the study.

Be sure to use the pictures that appear on the page with the text. They will greatly add to the interest. Thus, the text refers to the Lapps, and here is a picture to show the Lapp boy and man, their home and their reindeer. The polar scene carries the class to the home of the Eskimo. For another part of the text, here stands a Japanese girl with a baby on her back, and with tea leaves and blossoms thrown around the picture. On the right of the page are camels resting near tall date palms in the desert, while on the other side is a Nile water boy whose home is on the bank of the great river that flows through the desert. Perhaps the pupils can find at home other pictures bearing on the lesson. *Every pupil who contributes something will be interested.*

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first impressions of the distribution of land and water should be gained from a globe. Use the globe constantly in the geography lessons.

Bring out the thought that there is land under the water, and that the land which we see on the two globe-maps on page 2 is simply the part standing above the water level. The shell or cover of air is only about as thick in proportion to the earth as the peel of an apple is to the apple itself. There is very little air over fifty miles high.

Show on the globe-map of America, or better on a globe, the location of your city or town. Be sure that pupils read the map correctly, and know which parts are land and which are water; also how streams and mountains are here mapped. Let the pupils tell what the globe-maps show them about the land and the water on the earth. Allow time to study the little maps.

In a thin card cut a hole about as large as this letter "O." Place the hole *against* a globe or ball, keeping the card flat. The part of the globe that can be seen through the hole looks level, yet it contains many square miles more than we can see at one time on the earth's surface. Now make the hole half an inch wide and see how the surface of the globe appears through it.

The teacher may wish to speak of the ships of Magellan being the first to sail round the earth. Sailors often see the sails of ships at sea, when the hulls are below the horizon. School children in Australia or Chile never see the north star, but they can see many stars which we cannot. Lay little stress on the eclipse, unless the pupils have seen one.

etc., of other *distant objects*. As a rule, pupils are apt to think of themselves as starting-points for all directions.

The *exact* location of the magnetic pole is not known, but the map on page 125 shows the approximate position. This pole shifts, yet it is the pole which rules the compass needle. The needle is not attracted towards the true north pole.

TOPICS: North star, pointers, mariner's compass, points of the compass.

4. Directions on the Earth.[1]

This lesson aims to show how to read directions on *maps* and *globes*, and to avoid the false notion that "north is always at the top of the maps."

Use a globe constantly in this lesson. It may be well not to bring up the matter of the earth's *revolution* round the sun, but only the *rotation* on its axis. A candle used in a room slightly darkened by drawing the shades will clearly illustrate the lighting and heating of the earth as it rotates.

The text tells that "the sun can light and warm only a *little more than one half* of the earth at a time." In experiments with the candle and the globe, it is well to treat the subject as if exactly one half were lighted. This same suggestion will hold for the later lessons on the revolution of the earth, the zones of light, the seasons, etc.

The greatest good that can come out of this lesson is the ability of pupils to answer readily the questions in small type on page 4. Those who can do so know how

[1] See second footnote, page 38 *M.*

to read directions on every map in the *Complete Geography.* Drill the class by turning to some of the maps (for example on pages 5, 125, 169, 171) and asking which lines run north-and-south and which run east-and-west. The first thought should be "where is the north pole?" — even though the polar regions are not shown.

TOPICS: Rotation of earth, north pole, pole star, axis, equator; also the small-type map questions on page 4 *CG.*

5. The World Ridge or Primary Highland.[1]

The study of the *world ridge*[2] presents a simple unit as a basis for the details of relief, drainage, climate, products, people, commerce, etc. All the facts as soon as learned will take their places in this world unit and will fit together like stones in a temple. This thought of the world ridge as a center for grouping or relating geographic facts will stand forth more and more clearly as the lessons proceed.

The name *primary highland* is also given to the world ridge, — the great swelling upland that extends from Cape Horn to Good Hope, almost without a break, except at Bering strait; but the former name is also applied to the principal highland region in each continent. The primary highland of the world contains the divide or water parting which separates the

[1] See second footnote on page 38 *M.*

[2] The term *world ridge* has long been used by geographers on both sides of the Atlantic.

picture on page 85 suggests the larger animals of this country, and the text on the same page has already told that "Cattle, sheep and horses are found chiefly in the cool and the warm belts." Lastly, turning to the political map of Russia, page 109, the pupils locate St. Petersburg, as the capital; Moscow, the chief inland city; Riga, a port on an arm of the Baltic; Odessa, the Russian port on the Black sea; Archangel, the White sea port; Astrakan, the Volga and Caspian sea port.

In all the above study of Russia the pupil has worked unaided; the teacher has not supplied a single fact. The study of the *Primary Geography* has given the *power* to work out the leading facts in their *relations*, for the pupils can tell why Russia is suited to the growth of grains and forests; and to the raising of cattle, sheep and horses, etc. Those who are to remain in school and study the larger geography do not need this work, for they will approach the leading countries from a still broader basis.

TOPICS: Questions under each country, surface, products, cities.

Local Geography.

There are several editions of the *Primary Geography*, and each presents the special geography of a group of states. All pupils should study the general text, page 129, relating to the entire group of states, and the text in large type under their own state. The matter in small type may be used merely for reference, when needed.

of North America relative to Europe and Asia, showing why steamers from New York and Boston pass so near the Newfoundland banks, when on the way to Liverpool. Note also the distance between these ports. Then look for the same relations on the well-known hemispheres, page 5 *CG*.

As to proportions or comparative areas, one need only glance at the Mercator maps of the world, page 21 *CG*, to see that such a projection badly distorts all lands in the northern half of Asia, Europe and North America, and is useful only to show *directions*.

One of the strongest features of the world ridge map is the clearness with which it shows the oneness or continuity of the world's primary highland. This unity cannot be so clearly shown on any other kind of map, and the fact is well known to all geographers.

TOPICS: Land and water, world ridge or primary highland, slopes from world ridge.

6. Continents, or Grand Divisions.[1]

A few writers prefer to limit the name *continent* to the *three* separate land-masses of America, Asia-Europe-Africa, and Australia; but this word is so firmly rooted in our language, in its common application to North America, Europe, Africa, etc., that the latter usage will doubtless prevail. Owing to the close relation of Asia and Europe, these two continents are often treated as one, under the name of *Eurasia*. Hence it is correct to speak of Europe and Asia as

[1] See second footnote on page 38 *M*.

separate continents or to refer to both together as the continent of Eurasia. A continent may also be called a *grand division.*

Lead the pupils to discover on the world ridge map that arms of the sea wholly or nearly separate the continents from one another; that four of the continents spread around four great highlands of the world ridge; that Australia, an island so large that it is called a continent, does not contain any part of the world ridge. Pupils should also discover the answers to the questions in small type.

Show the class the relief maps on pages 28, 54, 62, 74, 88, 96. The sight of these large maps will tend to impress the individuality of the continents, while the world ridge map will tend to relate the individuals as to size and position.

TOPICS: The questions in small type on page 5 *CG* will take the place of topics.

7. The Oceans.

Use a globe. The pupils should grasp the idea of a great body of water spreading round the Antarctic region, from which the other parts of the sea extend like arms between the continents. This gives unity to the water area and at the same time relates it to the world ridge.

Make the oceans seem real by showing pictures of each of them. Thus, on page 119 will be found pictures of vessels and of a lighthouse on the Atlantic; at the top of pages 114 and 115 is an Arctic scene; page 56

shows a vessel sailing from the Atlantic into the Pacific, by way of Cape Horn; the sea in the picture on page 55 is an arm of the Pacific, and the water views on page 98 relate to the Pacific; the Madras natives, shown on page 170, launch their boats upon a broad arm of the Indian ocean. Encourage the class to look for other views of the oceans.

With the above simple ideas of the sea, let the pupils study the small-type map questions.

TOPICS: The questions on page 6 *CG* may take the place of topics.

8. Waste of the Land.

There should be at hand, for pupils to see and handle, some pebbles broken open to show decay or weathering; some rotten or crumbled rock, the result of weathering; a little fine soil. This subject suggests nature study, for the objects of study are everywhere easily obtainable.

Rocks decay as wood does, only more slowly. Since the change in *weather*, from hot to cold, from dry to wet, or *vice versa*, makes rocks — both coarse and fine — decay, we say that rocks *weather*; that is, they decay as a result of changing weather. The process of decay is known as *weathering*.

It is suggested that, in place of studying lesson 8 *CG*, pupils be given an object lesson on the subject, using the pebbles, crumbled rock and soil. After the oral lesson, let the class simply read lesson 8 *CG*.

The terms *rock waste* or *land waste* mean merely the loose matter that comes from rocks as they decay or are broken up in any way, as by frost or by being rolled against one another in the beds of streams. This rock matter is called *waste*, whether lying in heaps at the foot of cliffs (talus), blown by wind (sand and dust), borne away by streams (gravel, sand and silt), or dragged by ice (glacial drift), or spread by water over flood plains (alluvium), or on the sea-bottom (marine sediments). Rock waste may be boulders, pebbles, gravel, sand, clay or even fine dust. Rock waste is often called *soil*, but this word is perhaps better applied to fine rock waste mixed with decayed or decaying leaves, twigs, grass, etc., or with any animal matter or with all these.

On the following pages of the Complete Geography will be found pictures of rock waste. The fans of rock waste or alluvium, page 8, were washed down by water ; the dunes on page 9 were heaped by the wind ; on the same page is a heap of rock waste left at the melting end of a glacier ; the boulders in the mountain torrent, page 11, were washed by the strong current from the mountains ; the fine soil of the delta, page 13, was deposited by the river as it reached the quiet water of the sea ; the Adirondack lake plain, page 13, shows where a lake once stood, — the plain being made of fine waste that settled from the water ; the pebble beach, the bars and the sandy shore, page 17, are formed mostly of rock waste from cliffs torn away by storm waves. Let the pupils see these pictures. *Where have they seen rock waste?*

To teachers who are interested in nature study, it is perhaps needless to suggest that this lesson may lead out to the study of various kinds of soil, as well as to the common minerals that are weathering and thus slowly forming soil in the school district.

TOPICS: Decay of rocks, rock waste or land waste, soil, where rocks weather quickly.

9. Rainfall.

Try to reserve this lesson for a rainy day. Keep within the limit of very simple work.

This lesson calls for little if any direct study of text. The pupils doubtless know the facts, or can readily reason them out, if guided by questions such as the following:

What does rain come from? What moves the clouds?

When rain falls on the ground, what becomes of the water?

What becomes of most of the rain falling on steep hillsides? — on soft level land? — on broad ledges?

In which of the above cases does the rain water wash away the most soil?

The easiest and best way to present this lesson is by leading pupils to observe the facts in nature. If the day is rainy, the pupils can hardly go to and from school without seeing every point illustrated in a score of places.

TOPICS: Use the above questions in place of topics.

10. Springs and Streams.

Refer to the following pictures in the *CG*: page 7, flooded river; page 30, geyser and hot spring; lower picture on page 36, showing sources or heads of streams; map on pages 34–35, showing sources; upper group on page 92, a region of drouth, and a well that taps the ground water; with pipe well driven for water, compare pipes driven for oil, page 139.

For this lesson try the topical plan 3, page 10 *M*.

TOPICS: Ground water, pipe wells, springs, head or source, drouths, frozen soil, flooded streams.

11. Land Waste on the Way to the Sea.

Try to illustrate this lesson by reference to nature.

The first paragraph of this lesson is the only one that presents the slightest difficulty; but if the teacher grasps the thought of the slow creeping of the great mass of soil on every slope, the pupils can easily be led to the same thought. Before assigning this lesson for study, the teacher may explain the two aspects of moving soil, as follows:

First, note the rapid moving of surface rock waste on steep slopes, either by water or by mere sliding down, as shown in the pictures on page 8 *CG*; by streams, as suggested by the delta on page 13 *CG*; by ice, page 9 *CG*; by winds, page 9 *CG*.

Second, note the thought of the very slow creeping of the entire sheet of rock waste on a slope, even though it be a very gradual one. Thus, suppose a layer of rock

waste, fine and coarse, covering a gentle slope to the depth of ten feet. As the rain filters through this waste, it slightly moves the particles and even large boulders, by washing or dissolving away their support. As the waste settles to rest, it tends of course to roll downhill, however gentle the slope may be and however deeply buried the waste may be. When fine rock waste is wet, its particles may be held apart by the rain water; but as the water dries out, the particles settle together, always tending down the slope. Water freezing in the ground loosens the rock waste and helps it to move downward. As the waste weathers finer and finer, it is more easily moved by the wetting, the drying and the frosting.

This slow creeping is often the cause of the caving-in or falling of sand and gravel banks. Sometimes the speed is quickened into landslides, especially on mountains.

Some slopes, as mountain sides, are so steep that the waste is carried away as fast as it weathers, leaving bare rocky ledges. Other flat surfaces have such gentle slopes that the waste has time to weather very fine to a great depth; that is, the soil forms faster than it is carried away by running water, until at length, being so deep, its bottom weathering is so greatly retarded that the soil is carried away at the top as fast as it forms below.

Pupils can easily grasp the idea of *alluvial fans*. The word *alluvium* refers to soil, mud, sand, or any other deposit made by water. The name of *alluvial fan* is given to any fan-shaped body of alluvium. Such fans

form along the base of mountains, and often spread far out into valleys. One of these fans on the north side of the Pyrenees extends fifty miles from the range; see text, page 85 *CG*. Almost the entire valley of California is bordered by broad and fertile alluvial fans, and the valley bottom is covered with soil washed from them. The best orange lands of southern California are on alluvial fans, in some of which the soil is 100 feet deep. The Ganges river has been pushed far southward by very flat alluvial fans stretching out from the southern base of the Himalayas; see text, page 71 *CG*. Thus it will be seen that these fans form very important features of the earth's structure.

This lesson may be studied topically, according to lesson plan 3, page 10 *M*.

TOPICS: Creeping of rock waste, roots in soil, waste on steep rocky slopes, alluvial fans, soil on gentle slopes, topsoil in valleys.

12. Work of Winds.

This lesson seeks to impress the great value of winds as a geographic agent, in changing the land surface, causing waves, moving clouds, etc. The lesson is well suited to topical study; also, read and talk over the text in small type.

Speak of dusty days when clouds of dust may be seen, and refer to its settling where the air is still. Sand is often used to etch glass, — the sand particles being blown against it with great speed. In like manner the drifting sand in dry regions or deserts cuts other

grains of sand, as well as ledges, and helps to reduce them to dust.

Study the pictures of dunes. Desert dunes travel many miles, often keeping the V-shape or forming rounded hills, and leaving the ground smooth and bare. The Sahara picture presents a characteristic scene, for a large part of the desert consists of lofty wind-swept table-lands, bare and rocky. Some Sahara dunes are fully 600 feet high. Shore dunes, or high banks of sand, are common along all sandy shores where the prevailing winds blow inland.

Later lessons tell more about the work of winds at sea, bearing vapor and causing ocean currents; lesson 12 deals with only the simpler phases of the subject.

Illustrate the effect of wind in mixing air, by calling attention to the ventilation of the schoolroom. The impure air in the room must be carried away to places where plants can purify it.

TOPICS: How plants affect the work of winds, wind and sand, dunes, waves, pure air, vapor.

13. Snow and Ice.

Turn to the relief maps of Asia and Europe, pages 62 and 74, and point out the Himalayas and the Alps as examples of mountains on which snow lies all the year and forms great glaciers. If snow can be obtained, illustrate in part the change from snow to ice, by having the pupils squeeze snow very hard in their hands. In the cooler half of our country, everything to illustrate this lesson can be found in a street gutter filled with

snow and ice. Note also the melting snow on roofs, and snowslides from the same.

The greater part of this lesson may be centered in the pictures. Page 10 shows a glacier in full, while page 9 gives a nearer view of the rock waste, or moraine, at the end of a glacier; the views of icebergs, pages 9 and 10, illustrate huge blocks broken off and floating away, carrying boulders and fine waste; the rocks smoothed by ice-action tell the story of how a sheet of ice moving over a hard ledge may round off and polish the hardest rock and carry away the rock waste.

The Greenland ice-sheet view was engraved from one of Nordenskjöld's photographs and shows the exact condition of interior Greenland to-day. This ice-sheet is doubtless more than two miles thick in many parts, and is slowly, very slowly creeping seaward and sending long tongues or glaciers into the sea. This picture shows how the northeast quarter of the United States was covered ages ago by ice moving southward from Canada.

Some teachers may not think it desirable to present the small-type text which refers to lateral, medial and terminal moraines, but others will wish to use such text. Here, as in many other parts of the book, the text was planned to meet the wish of all; but being in small type it can readily be dropped. The same may be said of the term *drumlin*, though to the pupils in the northeast quarter of our country *the drumlin is much more important than any text on volcanoes.* Here the drumlins, or rounded heaps of drift, may be counted by hundreds —yes, thousands — and exert great influence on drainage, soil, gardening, forestry, etc.

The rounded hill shown on page 10 *CG* is a typical glacial hill or drumlin. If a pupil lives in New England or in any state bordering on the Great Lakes, there is some excuse for his not knowing much about volcanoes, but he ought to know a great deal about the roundest, prettiest, best cultivated hills of his native state. He should at least know that they are heaps of rock waste accumulated by the ancient ice-sheets of glacial times, and that they grew round and smooth as the ice crept over them.

To illustrate briefly what a drumlin should mean to a person living in the ice-sheet area, or region of drift, turn to a map of Boston and vicinity. This city was built on Beacon, Copp's and Fort hills, — all drumlins, all made of gravel and sand. Fort hill, being small and easily dug away, was removed and the area graded for building purposes. On Copp's hill stands the "Old North church" in whose tower the lanterns were hung to notify Paul Revere of the route of the British (see picture on page 106). Here also the British placed cannon to bombard Charlestown, during the battle of Bunker hill; the latter, by the way, is a drumlin. The state capitol is built on Beacon hill — a drumlin — where the beacon light used to shine out for sailors. Washington placed cannon on Dorchester heights — a drumlin — in South Boston, and drove the British from Boston. The strongest fortification in Boston harbor is inside a drumlin on Governor's island; and the other rounded hills of the harbor islands are all drumlins, though some now present gravelly bluffs to the action of the waves. In the beautiful suburbs of

Boston scores of drumlins are covered with fine residences and park-like farms. *If these were volcanoes they would be so taught; then why not teach what they are?*

Which is the more important for a Boston boy, the knowledge of how drumlins were formed or the knowledge of how volcanoes are acting in Iceland and Java? Nobody denies that the latter should be taught; how about the former? What is true for the Boston boy is also true for every pupil in the northeast quarter of the United States, where drumlins are common, — from Massachusetts to Wisconsin.

This subject of drumlins has been treated at length here, to explain why other topics, such as ice-sheets, glacial lakes, drift dams, drowned valleys, etc., find a place in the *Complete Geography*. The selection of topics has been influenced, not by what past geographic teaching has been, but by what the present should be and the future will be. Subjects which apply to large areas are included, but unless of very wide application, they are in small type, so that teachers may readily select such as meet the needs of their pupils.

Lesson 13 *CG* may easily be presented by topics.

TOPICS: Glacier ice, glaciers and rock waste, rock waste and lakes, icebergs.

14. Rivers and River Systems.

Illustrate every part of this lesson, if possible, by reference to streams near the school. A tiny brook will serve to illustrate *head* or *source* and *mouth*. If it has one or more branches, it will give the idea of

system. Any deep lake, deep river or harbor will throw light on the word *navigable.*

Use many pictures. Thus, the glacier, page 10 *CG*, contains the source of a small stream; the Alaska delta, page 13 *CG*, is at the mouth of the Yahtse river; the picture at the top of page 12 *CG* shows several river systems; see also the map on pages 34-35 *CG*, for river systems and tributaries; the steamer on page 27 *CG* shows that the St. Lawrence is navigable; other navigable waters are found on pages 39, 43, 46, 119 *CG*.

Try the topical plan for this lesson.

TOPICS: Head or source, mouth, river system, tributaries, navigable rivers.

15. River Basins and Divides.

Re-read the notes on lesson 14. Lay stress on the *divide* or *water parting.*[1] Impress the fact that a divide may be found on land that has no *perceptible* slope, as

[1] The term *watershed* is objectionable. Even its dictionary meaning is double. Webster's International defines it as: 1. "The whole region or extent of country which contributes to the supply of a river or a lake basin. 2. The natural boundary of a basin." In its second meaning it is synonymous with *divide* or *water parting*; in its first meaning it is a *river basin* or *lake basin.* The latter meaning, namely the drainage area of a river or lake, is now commonly accepted by geographers, while the term *divide* or *water parting* is the name of the boundary line of such a drainage area.

Watershed is derived from the German *wasser* = water, and *scheide* = a place where two things are parted (from *scheiden*, to separate or part). *Water parting* has therefore been widely adopted by geographers, since the word *parting* expresses the thought more clearly than *shed*, and moreover avoids the double meaning given to the

well as on the highest and sharpest mountain ridges. Refer to the map on pages 34-35 *CG*, and try to trace the divide of the Mississippi basin on all sides. In many places it will apparently be lost in the plains and prairies.

TOPICS: River basin, divide or water parting, land drained by a river system.

16. Young and Old Lands.

This lesson suggests the thought that natural regions pass through stages of life, from youth to middle age and old age, as people do.

The time has come when the teaching of geography in the common schools should recognize the great advance made by geographers in the study of the *age of lands*. With a firm belief in the ability of teachers to deal with the latest and best results of such geographic research, the study of the age of natural regions has been given a place in the *Complete Geography*, not only in this lesson, but also in the lessons on coastal plains, lake plains, lava plains, rivers, mountains, etc.

The age of lands is studied not for the mere facts of age, but to call the understanding to aid the memory of form and the relation to life. It is of little consequence to know that the prairies of our country are a *young* plain and that the plateau of West Virginia is *old*, unless these terms are a key to the condition of

latter. The word *divide* is perhaps better than either of the others, is more widely used by scientists, and is generally used in the *Complete Geography*.

the surfaces and to the ease with which people can occupy the lands. But when we know that one characteristic of young plains is evenness; that the valleys worn by streams in such plains are narrow and are mostly near the main streams; that as a whole the surface is little broken and presents immense level areas over which railroads and wagon roads can easily be built; etc., — then the word *young* has depth of meaning and calls the understanding to aid the memory of the surface, the products, commerce, and other geographic elements. Likewise, when the word *old* helps to picture the ruggedness of the plateau in West Virginia; helps to bring to mind a surface cut by deep and wide valleys, where travel is difficult except along the river valleys; where there is little level land, except in the valleys; yet where the eroded plateau reveals layers rich in coal, iron, oil, etc., — then the word *old* is brimful of meaning, and like the word *young* calls the understanding to aid the memory of geographic facts or relations.

How is it possible to compare the sharp peaks and ridges of the Rocky mountains with the rounded domes and ridges of the Appalachians, without knowing that the latter owe their form largely to ages of weathering? The forms of mountains, the contours of valleys, the grades of rivers, the productiveness of soil, the storage of water in lakes, the presence of falls and rapids giving water-power in rivers, — these and hundreds of other geographic conditions find their explanation chiefly in the *mode of formation* and the *age of the region*. Let lesson 16, therefore, at least suggest the thought of

ages or cycles, during which regions are formed, pass through youth and middle age and attain old age.

The age of a land depends, not on the actual number of years it has been subject to change, but on the state, condition or degree of the change. Suppose a smooth sea-bottom to be lifted slowly into a plateau, forming a new or young region. Time passes, but even though streams have worn *deep* but *narrow* valleys in the plateau, a geographer will at once say that it is still *young;* yet the wearing process may have gone on for thousands of years in a region of heavy rainfall, or for hundreds of thousands of years in a region of light rainfall. The test of *age* is not absolute time, but only the state or degree of wearing away. The Colorado plateau region is young, though there are deep but narrow canyons cut in it; for how small is the work already done compared with the great work remaining! What ages must pass before the rain and rivers can reduce the surface to the condition of aged New England!

When the streams have cut their channels to gentler grades, and the valley-sides have weathered away and been eroded to gentler slopes, we may refer to the region as being of *middle age.* When the streams become sluggish, from having cut their channels almost to a *base level,* and the valleys have become very broad; and when the whole surface has been worn down to gentle slopes, we may know that the country is *old,* — perhaps *very old.* Thus one region, under the action of frost and heat and rain and drouth, may grow from youth to old age very quickly, while another region having a warm and dry climate may age very slowly.

It is not expected that pupils will grasp fully the problem of the age of land, from this one lesson. The thought will grow as various regions are studied. At present let them compare the pictures with the text and grasp the meaning in part. Then as they study the descriptions of regions, in the later text, they will form clearer ideas of the surface, climate and life, by knowing that some are young and smooth, or only slightly worn away; others are deeply cut and their valleys widely worn; still others are worn away to gentle grades.

Does it not help even the teacher to picture the llanos, the pampas, the lower Siberian plain, and other plains, to know that they were once smooth sea-bottoms; that they were gently raised above sea level; that they are so *young* that rivers have cut their channels only a little below the general level?

We shall also find that the age of land largely determines the products. In the old worn-down highland, a mere fragment of an ancient highland around Lake Superior, also in the old Appalachian highland, in the weathered highland of northwest England and Wales, in the remnant of ancient mountains in southern Germany, etc., are found the richest iron mines in the world, because there the upper rock masses have been worn down to ore-bearing rock.

The old New England region has excellent building stone, crystalline and hard, such as is found in deeply buried layers from which the upper layers have been worn away; but the young coastal regions of the Southern states have softer rocks, formed as upper

layers of sediment on the sea-bottom and therefore unsuitable for road material and for building purposes, yet yielding valuable marl, potter's clay, etc.

Illustrations almost without number can be given to show that the age of land is one of the most important factors in all geographic study of surface, yet the text of the *Complete Geography* recognizes the fact that the work must be made easy and that only the simpler and broader ideas of *age* can now be given to pupils.

In addition to the topical study of this lesson, have pupils read the small-type notes and describe the pictures.

TOPICS: Work of swift rivers, widening of valleys, young lands, middle-aged lands, old lands.

17. Flood Plains and Deltas.

This subject presents two simple forms of land that support more than one half the human race. Are they not worthy of a place in a geography?

Flood Plains. — By this term is meant simply the low lands that are overflowed by streams in times of flood or when the streams run fullest. Flood plains are often called *river bottoms* or *bottom lands*. They are covered with silt or sediment left there by the rivers.

Before teaching this lesson the teacher should *fill up* with the subject; and it will doubtless prove helpful to read about the great flood plains described in the *Complete Geography*, as follows: Amazon, page 59; Ganges, 71; Mackenzie, 50; Mississippi, 51; Nile, 90; Orinoco, 61; Rhine, 85.

See also the pictures of flood plains, as follows: Ems, page 13; Mohawk, 43; Rio Grande, 47; Mississippi, 49; Patagonian, 61; Yellow river, 69; Rhine, 59. Surely no teacher who reads of these wonderful regions and studies the pictures can for one moment question the great value of leading pupils to learn how such plains are formed!

Try to show a flood plain in the school district, even though only a little meadow which some brook floods in time of heavy rain. Show the pupils some of the pictures cited above, and let them have for a reading lesson the small-type text on one or two of the great flood plains, for example, the Mississippi, page 51, and the Nile, page 90. This work, in addition to the topical study, will impress the leading facts.

Deltas. — The lower end of a flood plain, advancing into the sea or into standing water, is a delta.

People living on delta plains are counted in hundreds of millions. About one fifth of the human race is found on the vast delta plain of the Yellow and Yangtse rivers (see page 69). The Ganges delta fairly swarms with people, while the deltas of the Nile, the Po, the Rhine and other rivers also teem with life. Surely no teacher can feel that pupils can afford *not to study* delta plains, since so many millions of fellow beings owe their support to the fact that rivers bring down and deposit fine soil at or near their mouths.

Here, again, the teacher needs to *fill up* with the subject. Read about the following delta plains, as described in the *Complete Geography*: China, page 69; Ganges, 71; Mississippi, 51; Niger, 93; Nile,

90 ; Po, 79 ; Rhine, 85 ; see also the title *delta plains* in the index of the geography.

Pictures of delta plains are shown on these pages: Alaska, 13 ; Holland, 85 ; Rotterdam, 164 ; Calcutta, 170 ; Alexandria, 172. Show some of the above pictures to the pupils and let them read one or two descriptions which they will study later, — for example, the great delta plain of China, page 69, and of the Mississippi, page 51. These will give the subject real application and will also show pupils the value of the lesson. It will certainly do no harm to tell the class that these early lessons in the geography pave the way to the study of great natural regions of the earth.

Of far greater value than the text and the pictures would be the study of a real delta forming in a brook or even a rill made by rain, or in a street gutter. Let the class see a delta *growing*, even if it is necessary to make one by pouring water on sand on a molding table. It is a good plan to mold a river basin in clay, on the molding table, cover it with fine sand, and sprinkle water upon it. Tilt the table slightly and see the delta form in the quiet water at the lower edge of the molding table or in a "lake basin" made of clay at the mouth of the miniature river. Such work is far better than any text.

In the study of surface forms the molding table should not and cannot take the place of nature, but may be used to awaken the mind and direct it to nature or to good pictures of the same. Used as a means of arousing and riveting the attention, the molding sand is an excellent device.

TOPICS : Silt, distributaries, deltas, soil of deltas.

18. Coastal Plains and Lake Plains.

The largest plains in the world are *coastal plains;* among the most fertile are *lake plains.* This lesson shows how such plains are formed, and the understanding will aid the memory of what they are.

Coastal Plains. — A coastal plain is simply a portion of sea-bottom that has been slowly raised out of the sea. As a rule a coastal plain fronts on the sea from which it was upraised, while mountains generally rise along its inland border.

Teachers should read the text about coastal plains on the following pages of the *Complete Geography*: United States, pages 50-52, and map on page 32; Llanos, 61; Siberia, 67. The La Plata plain, or pampas is a young coastal plain (see page 60 *CG*).

See pictures as follows: Coastal plain, page 12; coastal plain, 13; all pictures on page 51; rice field, 52; all pictures on 148.

As in lesson 17, show some of the pictures and select a reading lesson, for example, lesson 54. This work will supplement the study by topics.

Lake Plains. — A lake plain is simply the bottom of a lake exposed when the water flows off or evaporates. This is well illustrated by any muddy hollow which shows where a mud puddle has stood.

Teachers should read about the great lake plains of the Red river valley and of Hungary, pages 48 and 80 *CG*; also of the Caspian basin, page 69.

The following pictures show lake plains: three on page 13; Estes park, 31; border of Great Salt lake,

31 and 154; Dakota farms, 49 and 152; vale of Kashmir, 65; Old Delhi, 68. The Adirondack lake plain, page 13, is the best of the views, because it shows the *setting* or surroundings of the lake basin. The view of the old Lake Michigan shore shows where the water once spread over the low land as far as the bluffs.

Direct the pupils to read the last three paragraphs on page 48.

Lessons 17 and 18, together with the text on lava plains in lesson 20, lay the basis for the study of nearly all the great plains in the world. We shall read later of plains covered with drift or rock waste, brought by ice-sheets in the glacial period.

The careful study of plains is of the greatest industrial and political importance, and teachers will doubtless agree that to devote two entire pages to the processes by which plains are formed is far better than merely to say that "a plain is level land."

TOPICS: Sea-bottom, coastal plain, lake plain, soil of lake plains. The topic *plateau* may also be given, although the term applies to a lofty plain of any kind.

19. Mountains.

No attempt is made to state how all mountains were formed, but only to direct the thought to the chief process, namely, the weathering and erosion of great upheaved areas. Later lessons will broaden the subject, and suggest other processes, as pupils study the volcanic Cascade range, page 33 *CG*; the folded Alleghany ridges, page 44, or Jura, page 76; the young

and growing Alps, page 76; etc. The teacher may now with profit read of these regions; the pupils also may examine the mountain pictures on the pages named, as well as on pages 14, 36, 40, 42, 53, 64, 77.

The common experiment of pressing layers of paper, clay, or putty, to illustrate how mountains are formed, should be used with caution. It applies to the Jura ridges, and more remotely to the Alleghany ridges (see lower picture on page 44), for the latter have undergone ages of weathering and erosion; but it does not apply to the Sierra Nevada, the Cascade mountains, the Wasatch, nor the young mountains shown on page 36. Let the experiment have special application to mountains of the Jura type, but do not make it too general.

Emphasize the facts that earthquakes are characteristic not alone of volcanic regions, but also of regions where mountains (as the Coast range of California and the Alps) are still growing and their rock layers are slipping or faulting.

Show pupils how mountains are represented on maps, such as those on pages 34-35 and 155 *CG*.

TOPICS: How some mountains are formed, earthquake, range, system, avalanche, worn plateaus.

20. Volcanoes.

The aim of this lesson is to impress the work of lava as a means of changing the earth's surface. The entire lesson may be used as a reading exercise in class. The study of molten rock is so impressive that there is little danger of any pupil's forgetting the main facts.

To illustrate: When a pupil has read aloud the first paragraph of the lesson, call attention to the two pictures of lava flows or lava plains on page 15 *CG*; to the lava wave, page 31, showing the form in which this lava cooled; to Mt. Hood, page 30, and Mt. Shasta, page 33, two cone-shaped heaps of lava. The middle picture on page 14 is a lava plain cut by valleys.

The second paragraph of the lesson is illustrated by the young ash cone and by Vesuvius, page 15; also by Mt. Hood and Mt. Shasta, noted above. With the third paragraph study the lava flow, page 15.

In connection with the fifth paragraph, treating of an *eruption*, turn to page 79 *CG*, and read to the class the account of Vesuvius. The rest of the lesson refers to appropriate pictures and may be passed over briefly, as the same thoughts will be made clearer in later lessons.

The pictures on page 15 are worthy of close study as *types*. The young ash cone, found in Nevada, is typical of forms made when lava and ashes are blown out or burst forth with gases. The sides of the cone are smooth and show few signs of weathering; therefore we know that it is young.

This view of Vesuvius, taken during the eruption of 1872, shows the steam bursting from the sides as well as the top of the cone. This may fairly be assumed to represent the great eruption described on page 79. The picture on the latter page was taken on the same day but at a different hour.

The lava flow shown in the middle picture on page 15 took place in the Hawaiian islands, in 1880-1.

This view shows the nature of lava rock lately hardened and not yet weathered. The Idaho lava plain, next below, gives the appearance of such a flow after many years of weathering; yet this plain has crumbled only slightly and is now covered with hardy sagebrush.

The lowest picture of the group is the famous *Mato Tepee*, or bear lodge, of Wyoming. It is a shaft of lava whose summit is over 1100 feet above the plain. The shaft is made of prisms of lava, like those shown in the Giant's Causeway, page 84 *CG*. The huge mass was pushed up through the earth's crust ages ago when the surface of the surrounding country was above the level of the top of the shaft. The land has since weathered away and been carried off by streams, leaving this great stump or neck of hard lava rock standing like a tower. There are many such shafts, but of smaller size, in the western highland of our country. They are often called *buttes*.

Other related pictures will be found on these pages: Shoshone falls, page 58, showing where the Snake river has cut a deep canyon in a lava plain; Fusiyama, page 73, the sacred volcano of Japan; excavations, page 79.

TOPICS: Lava, volcano, crater, eruption, lava plain.

21. Waves.

Lesson 21 is so simple that suggestions for teaching it seem hardly necessary. A good plan to show wave action is to suspend a long rope and make waves in it, for pupils to study. Notice that the *wave forms* move

forward and back, but that any point in the rope does not move far. Mark places on the rope, by tying on bright pieces of ribbon or string. Perform another experiment, using a pan of water and a floating object to illustrate wave action.

The large picture on page 3 *CG* shows distant swell and the breaking into surf in the foreground.

Tell pupils that a few years ago (1883) a volcano (Krakatoa) in the strait between Java and Sumatra had an eruption, blowing away half its cone and causing a great earthquake wave to roll ashore on the neighboring islands. This wave drowned over 40,000 people and carried a large vessel far inland, leaving it high and dry.

This is a good time to discuss the action of waves on cliffs, as shown in the pictures page 16 *CG*; also the action of currents in carrying the rock waste of cliffs along shores, building bars in quiet waters of bays.

TOPICS: How waves are made, wave-forms, swell, breakers or surf, earthquake waves.

22. Shore Forms.

Pupils who have used a small geography doubtless know most of the terms in this lesson. Only the new names need attention. Dwell upon the terms — drowned valley, fiord, bar, lagoon, marsh, and such others as are not familiar to the class.

If possible take the class to a pond, lake or seashore, where the various forms can be seen and described; then the text of the lesson may be omitted or simply

read, after the study of nature. Lead pupils to discover as many of these forms as they can about home.

The term *drowned valley* is in common use among geographers who know the falsity of the old saying that "rocky coasts have good harbors, sandy coasts poor ones"; and who know the truth of the newer saying that "good harbors are found where uneven lands have been partly drowned, while poor harbors are found where smooth bottoms have been slowly raised from the sea."

Thus, the western coast of our country, for a stretch of 1000 miles, has only one excellent harbor (San Francisco), yet the coast is bold and rugged. In that entire length of 1000 miles, there was only one great valley crossing the Coast range, and so the moderate settling of the coast made only one large and deep harbor or drowned valley (*see page 38 CG*). The region of Puget sound and British Columbia, north of the 1000-mile stretch, has many fine examples of deeply drowned valleys, and therefore has numerous excellent harbors (*see page 39 CG*).

On the other hand, there are many first-class harbors on parts of our eastern coast where the shores can hardly be called rocky or rugged, such as New York, Philadelphia, Baltimore and Norfolk; yet all these harbors result from the partial drowning of valleys (*see page 52 CG*).

Other examples of drowned valleys are the long and deep harbors or fiords of Norway, the estuaries of the British Isles, the bays of Greece and Japan, and in fact most of the great harbors of the world, except some of

those on lakes and a few of those on rivers. Examine the coasts on the maps of Maine, page 143; Norway, 161; western Scotland and Ireland, 163; Greece, 165. See how broken they are, for the rugged lands have partly settled beneath the sea, making thousands of drowned valleys.

The drowned valley shown on page 16 *CG* is Nagasaki, Japan (*see map S in the supplement*). Other flooded valleys are pictured as follows: fiord in Norway, page 17; Golden Gate and San Francisco bay 39; Hudson river (to Troy), 43; fiord, 82; coast of Ireland, 83; Boston and New Haven harbors, 142; St. Lawrence river (up to Montreal), 158; Havana harbor, 160; Thames (up to London), 160; Mersey river (Liverpool), 162.

The three tide pictures on page 26 *CG* will be found helpful to explain island, peninsula, mainland, isthmus, strait, bay, etc. See also pictures on page 17; strait of Bosporus, 80 and 166; North Cape headland, 81; cliffs of Dover, 84.

Whatever the original usage of the words *bay*, *gulf* and *sea* may have been, it is now useless to try to make a distinction. See how nearly of one shape are the gulf of Guinea, page 173, the Arabian sea, 171, and the bay of Bengal, 171; likewise compare the gulf of Mexico, Hudson bay and Bering sea, page 125. The names have been applied by discoverers to large arms of the sea, without careful distinction as to form or depth.

There is a lagoon at the left of the bar, in the picture of Whale cove, page 17 *CG*; and at the right of the bar at the top of the same page. Refer to the map of

Texas, page 149, and show how bars and lagoons are represented on maps. Lessons 42, 53 and 54 mention bars along the coast.

Marshes or tidal marshes are easily understood. Pupils know that rivers bear down much silt and deposit it when they flow into the still waters of lagoons or other arms of the sea. There is a picture of a tidal marsh on page 17 *CG*. Such marshes cover thousands of acres along our Atlantic seaboard. Some day they may be reclaimed from the sea, as were the extensive marshes of the Netherlands.

It is a good plan to have pupils find the various shore forms, and also draw one or two of each kind, as shown on the maps, pages 34-35 and 126. This work will prepare them to read maps.

TOPICS: Straight shores, drowned valleys, shore forms, arms of the sea, bars, lagoons, marshes.

23. Belts of Heat.

This is a *pivotal lesson*, for on it turns the study of winds, rainfall, plants, etc. Be sure that pupils master the leading facts.

For many years great stress has been laid on the study of *zones*, as bounded by the tropics and the polar circles; yet these geometrical lines are not sufficiently accurate for work in climate and the distribution of life. Of far greater value is the study of the lines of heat bounding the *belts of heat*, for these afford much better guides to the distribution of temperature, winds, rainfall, plants, etc.

This lesson seeks to give only a general view of the heat belts. They will be presented in detail later, as in lessons 26, 28, 107, etc.

There are two kinds of maps to illustrate this lesson, — the globe-maps on page 18 *CG*, and the Mercator or flat world-map on page 21. Use both kinds.

In this lesson the leading thoughts to impress are: great distance of the sun from the earth; heating of the air *chiefly* from the earth's surface, *partly* by direct rays of the sun shining on matter floating in the air; vertical rays give the most heat, because they shine thickest on a given space;[1] as the earth rotates, a wide belt receives almost vertical rays all the year; on both sides of this hot belt the rays fall with greater slant and therefore make belts of less warmth.

The air receives three fourths of its heat by way of the earth, — the land and the sea; while only about one fourth as many rays are changed to heat by the floating dust and clouds. The fact that the earth heats the air can be made clear by holding a thermometer near a sunny sand bank, on a hot summer day; then two feet above it; ten feet, etc. See lessons 98, 99 and 100 in the *Primary Geography*.

Lead the pupils to trace the boundaries of the heat belts on the maps, but they need not now memorize these bounding lines. They will be learned in their connection with other parts of the subject. Here again, understanding helps memory.

[1] To impress the work of slanting and of vertical rays, refer to a road leading north and south over a hill. The north slope is much the cooler and often affords good sleighing or coasting on sleds, long after the southern slope has lost all its snow by melting.

TOPICS: Sun's distance, how the air is heated, hot belt, cold belts, warm belts, cool belts.

24. Changes of Season.

Pupils are here led to study *revolution*, the second principal motion of the earth, and to note its effect on the seasons.

In presenting this lesson and the next, teachers are earnestly advised to use the text merely as a guide to what they should *show pupils by means of a globe.* No text relating to the changes of seasons and the zones of light can take the place of explanation with a globe. Use any ball upon which the poles, the equator, the tropics and the polar circles are marked.

This simple device is often used: Let one pupil hold a bright object to represent the sun. Let a second pupil take the globe in hand. Set up a long stick to indicate the position in which the globe's axis should always be kept. This stick should have such a position that the axis of the globe, when parallel with it, will tip about one fourth from the upright position towards the horizontal. Now direct the pupil holding the globe to move around the "sun," keeping the axis always parallel with the stick which tips one fourth from the upright. The arrows in the diagram on page 19 *CG* show which way to travel. This illustrates how the earth *revolves on a fixed axis.* The path along which the globe is carried is the *orbit*, — almost a circle.

Let the pupil carry the globe round the sun a second time and lead the class to discover these facts:

1. Stop in that part of the orbit of the earth where the northern end of the axis leans most *towards* the sun. When pupils discover the place, tell them that when the earth reaches this part of its orbit, about June 21, we have the first day of our summer, while winter begins south of the equator. Rotate the earth and notice that the vertical rays strike far north of the equator.

2. Move from the June position till the rays shine vertically on the equator. This shows the position of the earth and sun on the first day of the northern autumn and southern spring, about September 22.

3. Stop in that part of the orbit where the northern end of the axis leans farthest *away from the sun*. This place is reached about December 22, on the first day of the northern winter, just before Christmas. Rotate the globe and observe that the vertical rays strike far south of the equator. It is the beginning of southern summer.

4. Continue around the sun till the rays again shine vertically on the equator. Thus we locate the position on the first day of the northern spring and southern autumn, about March 21.

5. Lead the pupils to discover that during one half the year the vertical rays fall north of the equator; during the other half, south.

After the above experiment, the pupils will understand lesson 24 much better than if they had only studied the text. Now let them read the text and examine the diagram on page 19 *CG*.

TOPICS: Earth's orbit, fixed axis, sun's position on first day of each season.

25. The Zones of Light.

This lesson shows how the sunlight locates the lines which bound the zones. Lay aside the text and rely on a globe. The text will suggest to the teacher what to teach, and will serve later as a reading lesson.

Perform the same experiments as in lesson 24. Find the part of the earth's orbit in which the northern end of the axis leans farthest towards the sun. On which part of the globe do the vertical rays then fall? *Rotate* the globe, holding the axis always in one position. As the globe rotates, notice where the vertical rays would fall on an entire day.

Mark the line where these rays would fall. Call this line a *tropic*, meaning a *turning place*, for here the sun *seems* to turn back towards the equator. In ancient times, when the sun was over this tropic, it seemed to move through a group of stars called *Cancer*, meaning a *crab;* hence we call this line the *tropic of Cancer.*

Move the globe till it reaches the part of its orbit in which the northern end of its axis leans farthest from the sun. Where do the vertical rays now fall? Rotate the globe and find the line on which the vertical rays fall during an entire day. This line is another tropic. It is called the *tropic of Capricorn. Capricorn,* meaning *goat,* is the name of a group of stars through which the sun formerly seemed to pass, when over this tropic.

Study carefully figures 3 and 4, page 19 *CG*, and see what is meant by vertical rays falling on the tropics. Notice that the tropics extend east-and-west,

the positions of the heat lines, just as they will later draw the coastlines of continents to fix them in mind. Let the pupils draw the heat lines on their outline maps until they can readily draw them without looking into their books.

At present pay little attention to the heat lines on the oceans.

As soon as the boundary lines of a heat belt are learned, the heat belt may be shaded so as to fix in mind its extent. The map on page 79 of the *Manual* shows what may be accepted as satisfactory work, — the coastlines being traced, but the limits of the heat belts being added from memory.

Let the class have an opportunity to show on a globe where the heat lines run. The globe alone can give the true idea of *belts* of heat. This subject will be carried further under the natural regions of the continents, pages 27 to 99, and in the study of heat belts, pages 108-111 *CG*.

Pictures may be used to advantage in this lesson. Direct the pupils to take one of their outline or coast-line maps of the world, referred to above ; have them draw from memory the lines which limit the *hot* belt in America ; before shading this part of the hot belt, examine the picture on page 60 *CG*, showing a forest along the great river Amazon, about which we read in lesson 15 ; tell the pupils that in this part of the hot belt the trees grow large and thick together, and that the Indians living there need but little clothing ; tell other interesting facts about this part of the hot belt ; then have the pupils draw the shading lines.

Treat the hot belt of the Old World in a similar manner. On page 92 are pictures of drier parts of the hot belt, — parts of the Sahara desert, about which we read in lesson 12; tell the pupils that south of this desert are grassy tracts and dense forests; then shade the portion of the hot belt in Africa.

Many spices grow in the hot belt, especially in the peninsulas of southern Asia and on the islands south-east of Asia; tell about these, and show the pictures on pages 72 and 73. Shade these parts of the hot belt. The picture on page 108 shows many of the plants of this belt.

Thus each belt may be studied, using pictures as follows: For the warm belt, the orange grove, page 38; vineyard, 39; scenes on 51 and 52; plants, 109: for the cool belts, scenes on 30, 31, 42, 49; plants, 110: for the cold belt, seals on 39; tundras, 68; plants, 111; animals at top of 114-115; see also small-type text in lesson 110, which may be read to the class. These pictures will help to give the *feeling* of the heat belts and are well worth an entire lesson period.

The above suggestions are partly a review of lesson 23, but viewed from a new standpoint. Now we come to the matter of the new lesson, — the study of the seasons in the heat belts.

Every pupil doubtless knows that when the sun shines on a pond and on sand or rocks or soil, the water does not become so warm as the solid matter. If pupils cannot be led to test the temperature of a pond and of soil, etc., they can at least set a pan of water,

a pan of sand, a pan of fine soil and a smooth rock in a sunny window, and find out which becomes warmest in the sunshine. This simple experiment is important, for it helps to impress the broad truth that under the summer sun the land becomes hotter than water ; conversely in winter, the land becomes much colder. Thus the first paragraph of lesson 26, and also much of the other text, will be made clear.

Pupils have studied about the changes of sunshine in the polar regions, and they know why the summers there are cool and the winters cold ; for even when the sun is over the nearest tropic, the sunshine striking the polar region must be very slanting. This holds true, though in a less degree, for the cool belts, except in the parts nearest the tropics.

Lead the pupils to the thought of *gradual decrease* in the length of the cold part of the year, towards the belt of greatest heat. Add to this the thought that the extremes of temperature are greater on the land than at sea.

As the pupils study the seasons in each heat belt, let them answer these questions : Are the sun's rays vertical or slanting? Are the days long or short? Is the warmest season long or short? Is there much or little land area?

Impress the unlikeness in climate between the cool belts north and south of the equator. In the south there is small change of seasons on the oceans ; the lands are not so broad as in the north ; the southern cool belt therefore has a more steady climate than the northern cool belt.

Besides studying from the topics given below, the pupils should sketch the little map showing the range of the heat equator.

TOPICS: Cold belts, cool belts, warm belts, hot belt, heat equator, shifting of weather with heat equator, weather of highlands.

27. Latitude and Longitude.

In order to read maps, pupils must know how to read distances in degrees and to locate by means of parallels and meridians.

The various diagrams on page 22 *CG* make this lesson clear. All that is needed in addition is exercise after exercise in reading latitude and longitude on the political maps in the geography. Give such exercises as this: Direct the pupils to turn to the map on page 163 and to tell in nearest degrees the latitude and longitude of London, Edinburgh, Dublin and Liverpool. Of course pupils are not expected to remember the answers, but simply to learn how to find the locations. Likewise, turn to page 125 and find the latitude and longitude of New Orleans, Philadelphia, San Francisco, Sitka, Chicago, Ottawa, Bering strait, magnetic pole, St. John's, Mexico (city), Havana; on page 169 locate by latitude and longitude (nearest degrees) Rio Janeiro, Quito, Cape Horn, Panama; on page 173, locate Monrovia, Boma, Cape Town and Cairo.

TOPICS: Degrees, tropics, polar circles, parallels, meridians, Greenwich, latitude, longitude.

28. Winds and Rainfall.

This is one of the most important lessons in the *Complete Geography*, and should occupy several lesson periods.

To lead to the study of motion in the air, and to show that cool air flows towards the places of greatest heat, or where the air is lightest, the following questions may prove helpful.

Why is the air warmer over a hot stove than under it?

The cool air round the stove is drawn (by gravity) under the heated air and lifts it; we may feel it rising.

Why do smoke and sparks rise over a fire?

They are forced up by the hot air which in turn is floated by heavier cool air.

What causes a draft up a chimney?

Cool air flows into the stove and floats the hot air upward.

What causes a draft when the window of a heated room is opened on a cold day?

The earth draws the outside cool or heavy air down to the floor of the room and pushes some of the heated air out of the room.

Why do soap bubbles rise?

They are filled with warm breath and are therefore lighter than the cooler air round them.

With what are balloons filled?

With light gases, often with hot air.

What causes air to move about?

The earth is drawing the heavier air under the lighter; the heavy air is floating towards places where there is light air.

Hold a thermometer in front of the draft of a hot stove, then over the stove; in which place is the air cooler, and in which direction is the cool air moving?

The cooler air is going into the stove.

Hold a piece of smoking paper at the bottom of a chimney on a lighted lamp; then hold it over the chimney; which way is the cooler air moving?

Into the lamp chimney.

What the pupils have learned from the above study may at once be applied to explain the trade winds, for they are simply currents flowing from the warm belts into the hot belt, towards the heat equator. In general these winds tend westward, — southwestward from near the tropic of Cancer, and northwestward from near the tropic of Capricorn. The flow of the trade winds results from the fact that the air is heavier in the region of the tropics than at the heat equator.

Aside from the trade winds, land and sea breezes, and a few other simple features of air circulation, the entire subject of the *causes* of the great currents of air is too difficult for pupils in the grammar grades, but the leading *facts* as to directions of winds can readily be learned.

The text of lesson 28 gives the simpler *facts* in regard to the winds. For so long a time have the conditions of winds and rainfall been wrongly stated that it will be pardonable to caution teachers not to teach that the rainfall of the North Temperate zone is

caused by warm moist winds from the southwest meeting cold polar winds. The United States map on page 23 *CG* presents the subject better than any text can. The winds of this zone blow mainly from a westerly direction. In this wide zone there are of course some places where the air is lighter than in others. The heavier air flows toward the lighter, not in straight lines but in whirls or eddies. Each great area of low pressure, or light air, becomes the center of an eddy; yet this center, as well as the entire eddy, moves eastward.

From all sides the winds eddy in, — some from dry regions and some from water surfaces; some from cold areas, some from warm. The large map on page 23 *CG* shows such a storm center over the middle of our country. The arrows show that the winds move from all directions spirally towards the center, — some from the dry basin region of the western highland, some from the gulf of Mexico, some from the Atlantic and some from Canada. The area for many thousand square miles round the storm center is receiving rainfall, and the cloudy area reaches out still farther.

This wind eddy, with its rain and clouds, moves eastward about as fast as an express train, giving out rain as it goes. There may be several such eddies following one another across the continents and oceans, as shown on the circular map on page 23 *CG*.

It does not seem desirable to explain to young pupils the principle of the eddy, further than to call attention to the fact that when water is allowed to run through a hole in the bottom of a tub or basin, the water moving

towards the hole does not go in straight lines, but it whirls or eddies as the winds do. As the theory of the winds of the temperate regions is beyond the grasp of our pupils, there remains simply the task of *telling* in simple terms the broad facts that most closely affect climate and the distribution of life. These the text aims to give. Pupils not having the false notions of winds will readily grasp the facts as here given. The maps on page 24 will prove helpful. These maps show several eddying storms yielding rain as they *travel eastward* over land and sea.

The subject of *rainfall* is one in which both the teacher and the pupils may easily be confused by trying to "explain" too much. In general we may say that clouds yield rain when *cooled* enough; yet this simple statement is a Pandora's box, and unless the teacher is thoroughly familiar with the subject she should lift the cover cautiously lest there should escape questions of relative humidity and temperature, saturation, dew-point, etc.

If pupils have not already formed the habit of observing the weather, as suggested in the *Primary Geography*, page 3, they should now be trained to keep a weather record. The following note from the small geography will serve as a guide. It is worded for the pupils.

WEATHER RECORD. — In a notebook keep a *daily* record of the weather. In the afternoon write whether the day has been *hot, warm, cool* or *cold; clear, cloudy, rainy* or *snowy; calm* or *windy.* Be sure to write the date.

This record will show you how to keep yours:

Dec. 6	. . . . warm	rainy	windy
7	. . . . cold	clear	windy
8	. . . . cool	clear	calm
9	. . . . cool	rainy	windy

Keep the record every school day for a year. Perhaps you can also take notes for holidays. At the end of the year you can count and find out which month has had the greatest number of warm days, rainy days, etc.

Many teachers and their pupils will be interested in a more definite record of the weather, as follows :

Date	*Temperature*			*Rainfall in inches*		*Wind*
hour	9	12	3			
Dec. 6	24°	45°	40°	Clear		S.E.
7	46°	54°	48°	Rain	2.5	S.E. ; S. ; S.W.
8	24°	20°	10°	Snow (melted)	.8	N.W. ; W.
9	10°	25°	30°	Clear		W.

This record may be kept on a blackboard or in record books. The blackboard has the advantage of showing the entire table to the class whenever the teacher wishes to use it ; but the record books require individual notes. Perhaps both may prove serviceable.

Under *temperature*, at least two hours should be recorded ; three are still better. The thermometer should be hung outdoors in the shade. Pupils may in turn be delegated to read the height of the mercury. By selecting hours at the beginning or the close of sessions, the work will cause no break in lessons ; and besides, after noting the temperature and at once going out of school, the pupils will be likely to pay closer attention to the weather. This holds true also of cloudiness, rain, snow and wind.

The term *rainfall* includes rain, snow, hail and all other forms of falling water or ice. *See footnote, page 23 CG.* The snowfall should be recorded in equivalent rain, by allowing eight to ten inches of snow for one inch of rain. Thus, eight inches of snow equal about eight tenths (.8) inches of water. In the record, state whether rain or snow falls. In the above table, under Dec. 8, there is a record of "Snow (melted) .8," meaning that the melted snow would equal eight tenths of an inch of rain. Make note of clear and of cloudy weather; perhaps a record can be kept showing the directions in which clouds drift.

The *wind* record may be made at fixed hours, or whenever there is a marked change in its direction. In the table above, the record was made after the latter plan. Thus, on the first day the wind blew from the southeast; on the second day it changed from southeast to south and then to southwest, etc.

From the study of the winds much can be learned about storm eddies. When pupils have observed local weather changes for a few months, try to connect with weather maps. Suppose yourself located in Boston, New York, Brooklyn or any one of the neighboring cities. Now turn to the map on page 145 *M*, or page 23 *CG*, and examine the storm eddy crossing our country. As shown on the map, the storm center is moving eastward across the prairies and may follow the St. Lawrence valley down to the sea. We will suppose this map to present the conditions recorded on the morning of the first day in the above table. The map shows *clear* weather, with wind from the southeast, for

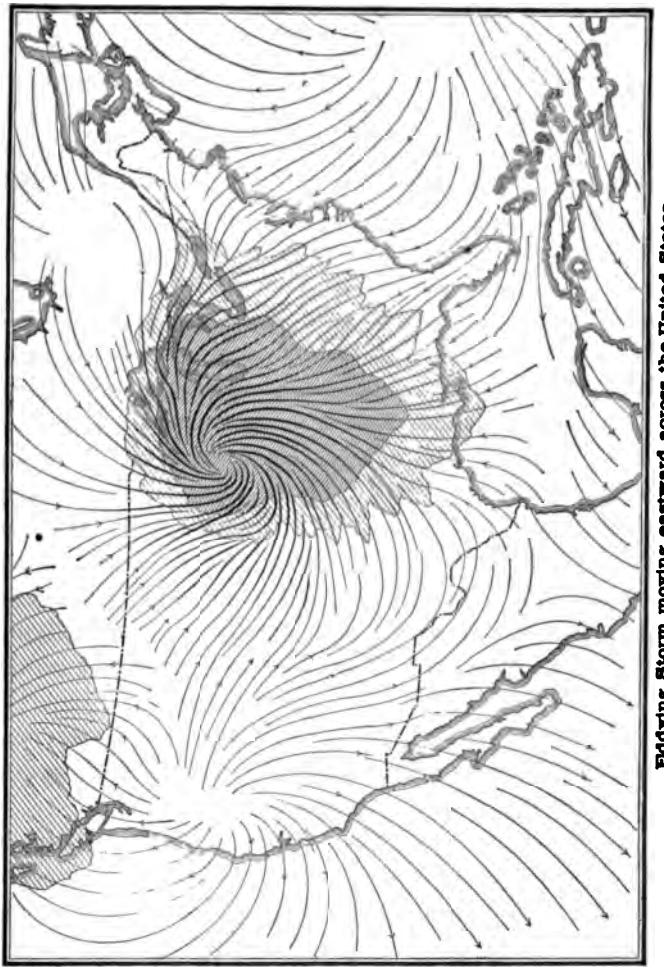
the cities above named. Blowing from over the Gulf stream the wind is mild, — the day is fairly warm for December.

On Dec. 7 the storm center passes north of the city, and, in passing, brings us a change in winds from southeast to south, then to southwest. We are near enough to the storm center to come within the rain area, and so record 2.8 inches of rainfall; the temperature is higher than on Dec. 6 (yesterday).

On Dec. 8 the record shows that the storm is so far past that we feel westerly winds, first from the northwest and then from the west; but those northwest winds have brought intense cold from the inland plains of Canada; the thermometer at nine o'clock is 24° and is falling. A snowstorm is raging. Next day is clear, and the afternoon brings warmer winds from the west.

Our simple record tells us that we were south of the storm center, for if we were north of it the wind would have changed or "backed" against the movement of the hands of a clock, as is easily seen on the map of the eddying storm.

Try to obtain some of the daily maps issued by the Weather Bureau and learn to read them. Even if the school cannot obtain the maps regularly, copies for study are easily obtainable from the Weather Bureau in Washington. Compare the daily record with the weather maps and so learn to interpret the meaning of the record and of the map. Finally, try to infer from the record what the state of the weather is in the vicinity; that is, when storm eddies are passing, and



Eddying Storm moving eastward across the United States.

NOTE. — The arrowheads show that the winds are eddying towards the storm center, where the dark shading shows the rain area, and the lighter shading the cloud area. The winds, rains and clouds are whirling eastward.

on which side of the school district the storm centers are.

Perhaps the most important facts under ***rainfall*** are these: When moist air is *cooled*[1] *enough* it yields rainfall (rain or snow); winds that are growing warmer can absorb more vapor and do not yield rainfall; winds that are moving into cooler latitudes or cooler heights yield rainfall when they are cooled beyond their point of saturation; the trade winds move toward the heat equator, and as a rule become warmer as they go, but where they are lifted over highlands (that is, to cooler heights), they yield rain on the *windward slopes;* in the belt of weak winds or calms near the heat equator, the air is being lifted to cooler height and therefore gives up great quantities of moisture; the rains of the westerly winds come chiefly in the eddying storms and are heaviest on western slopes of highlands and on western coasts, though these eddies may yield heavy rainfall on such inland regions as the prairies, if the eddying winds blow from over arms of the sea, especially southward from them, as the Gulf of Mexico.

Through the study of topics, teachers should see that the above facts are made clear, as this work underlies the study of the distribution of life.

TOPICS: Cause of winds, trade winds, weak winds or belt of calms, westerly winds, storm eddies; cause of rain, rains of trade winds, equatorial rain belt, rains of westerly winds.

[1] Air may be cold or it may be warm when it yields rain; for moist air of any temperature will give out rainfall when *cooled enough*, — that is, after the dew-point is passed.

29. Winds and Rains of Winter and Summer.

The underlying thought of this lesson is this: As the hot and the cold weather shift north and south with the changing seasons, so also do the belts of wind shift. In both cases the *heat equator* is a guide to the shifting, for as this line moves northward the warm weather and the wind belts do likewise; and *vice versa* when the heat equator moves southward.

The equatorial rain belt follows the heat equator north and south, and yields copious rains over a wide belt. Read lesson 64 *CG* to the pupils, or let the class read it.

The belts of trade winds and of westerly winds also swing northward and southward. These winds, therefore, do not blow steadily over the same lands all the year, and many regions in a wide belt over which the trades and the westerlies alternate have long periods of summer drouth followed by winter rains.

After the careful study of lesson 28, this lesson will not be difficult for the class if guided by topics, and if constant reference is made to the maps on page 24.

TOPICS: Equatorial rain belt, monsoons, westerly winds, interior of continents in winter and summer.

30. Ocean Currents.

The ocean currents, by their effect on the temperature and humidity of winds, greatly affect climate. Chief in importance are the great ocean eddies.

Leading geographers teach that the ocean eddies or currents are mainly caused by winds blowing against the waves or surface water of the sea. The continents, of course, turn the currents aside. Moreover, temperature, density, salinity, etc., affect the speed of the eddies, yet do not, *to any great extent*, modify the general direction of surface currents.

In making a comparison of the directions of ocean currents and winds, examine the charts on pages 24 and 25 *CG*.

The most important work in this lesson is to impress the notion of the great *eddies* in the oceans. The Gulf stream, the Japanese current, the Humboldt current, etc., are of much less consequence than the principal eddies of which they are mere parts or offshoots.

TOPICS: Cause of ocean currents, ocean eddies, Gulf stream.

31. The Moon and the Tides.

This lesson is placed here mainly for the use of those living near the seacoast where the tides can be observed and where many questions about them will doubtless be asked. To such the text in *large type* will be easily understood, after they have observed how the tides ebb and flow.

Teachers in inland cities and towns may receive some help from the three tidal pictures grouped on page 26 *CG*. These may be studied in connection with the large-type matter.

Show pupils the picture of the Liverpool dock, page 162 *CG*. There, in the broad Mersey, the tide rises

and falls many feet, making it very difficult to load or unload vessels without taking them into large inclosed docks where the water can be held at one level. The outer wall of the dock in the picture shows that the tide is low. Floating stages, or landing stages, are also used in Liverpool, and in most harbors where tides are strong.

The part of this lesson in *small type* is inserted chiefly for *reference*, and not for study. Some teachers, however, may deem the tides of sufficient importance to call for the fuller explanation of the small type. To correct the widespread notion that the moon travels in a looped path round the earth, — a notion that has come mostly from false diagrams in school books, — the figure is inserted at the bottom of page 26 *CG*, and a brief note is made in the text. This subject is perhaps not worthy of much time or space, yet if it is to be presented, let it be on a correct basis.

TOPICS: Tides, tidal currents, ebb and flood.

32. North America.

Notice that under each continent the *map studies* are to precede the text study; therefore the map studies of lesson 33 should precede lesson 32.

The notes on this lesson will apply also to lessons 55, 66, 76, 86 and 93, giving only a general view of each continent, and leaving the details for special lessons following.

Use lesson 32, as well as each of the others named above, for oral reading. Study the pictures. Train

the pupils as soon as possible to the habit of referring to the maps for every place or region named in the text. This is vital to the study.

After the class has read this lesson aloud and examined the maps, — the relief map of North America, the relief map of the United States (pages 34–35), the maps of heat belts (page 18) and the wind and rain charts (page 24), the books may be closed and the lesson reviewed topically. If the *reading* does not suffice to fix the important facts, assign the lesson next day for study by topics.

TOPICS: Shape and size of North America, general surface, heat belts, winds and rain.

33. Map Studies.

The notes on this lesson will apply also to lessons 56, 65, 75, 87 and 94.

As stated in a footnote on page 27 *CG*, this lesson should precede the 32d. Suggestions for map studies will be found on pages 23–27 *M*; see also hints on map drawing, pages 27–30 *M*; molding sand, pages 30–32; map modeling, pages 32–36.

In all map studies of continents use the little globe-maps to show location in the world ridge, relative positions of other continents and oceans, comparative areas, etc. A few questions will serve to direct the globe-map study, as: What oceans and continents would you cross in going due east round the earth from the region of the Great Lakes? What oceans would flow together if North America were to sink below the level of the sea?

With the relief map on page 28 *CG*, study the map of the United States, pages 34–35, using the map on page 32 as a key to the names of regions. Let this study be simple, for the various regions will be taken up in detail later.

Lay great stress on the map studies; no lessons in the geography are of greater importance.

34. The Rocky Mountains.

This lesson will be used as an example or a type for the teaching of many other lessons, and will therefore be treated quite fully.

In almost all the lessons as far as the 96th, the same maps, except of course the special relief maps of the continents, will be used; and this constant use of the maps of heat belts, winds and rainfall, ocean currents, etc., will serve to impress the earlier work. The very best kind of review is not that which simply repeats the early work, but is that which *uses the old to help build the new.*

Lesson 34, like scores of others to come, calls for the use of *maps*, *pictures* and *text*. Let us first see what we can learn from the various maps. This part may be assigned for study in school or at home, or it may be guided by the teacher in oral lessons.

Turn to the relief and key maps, pages 28 and 29 *CG*; also pages 34–35. Be sure that the pupils know that the name *Rocky Mountain highland* (*see key map, page 29 CG*) is given to the entire western highland of North America, while the name *Rocky mountains* (*see*

relief map, page 32) is applied only to the eastern mountain system of this highland. Before reading the text of lesson 34, let the pupils tell what they have already studied about the Rocky Mountain highland; also what else the relief maps, pages 28 and 34–35, show about this great highland.

Then study the Rocky mountains proper, on the same relief maps. Lead the class to discover that these mountains are not a single range but consist of many ranges; that the parts of these mountains in the United States lie far inland; that they form the divide between many large rivers; that they lie along the eastern border of the great western highland; what large rivers drain the various parts of the Rocky mountains; etc.

Next study the Rocky mountains as related to the heat belts, using the maps on page 18 *CG*, thus using the old to help build the new. These little globe-maps show that the Rocky mountains reach so far north and south that they extend from the cold belt across the cool belt and far into the warm belt north of the equator.[1]

Turning to the season chart on page 21 *CG*, the pupils read on the chart what the seasons are in the mountain region, keeping in mind the fact that on high peaks the weather is colder than in the general upland; thus the class reviews the seasons by using the old to help build the new knowledge of the Rocky mountains.

Perhaps in passing it may be well to refer to the

[1] The Rocky Mountain highland extends far into the hot belt; the Rocky mountains do not enter that belt, but end at the Rio Grande.

political map of North America, page 125, and learn that these mountains extend from near the tropic of Cancer to beyond the Arctic circle. What does this fact recall about the days and nights and the seasons, especially in the far north?

Pupils have studied the maps of winds and rains, page 24 *CG*; what knowledge along these lines will help in the study of the Rocky mountains? The maps show that throughout their entire length the mountains lie in the path of the westerly winds and their storm eddies; and the class will infer that the ranges receive most of their rainfall in winter and on their western slopes. But the pupils know that the Rocky mountains in our country are far inland, with other lofty ranges nearer the vapor-yielding Pacific; therefore the rainfall of the Rockies cannot be heavy.

Looking closely at the maps on page 24 *CG*, the class will find that the northern and middle parts of the Rocky mountains are in the path of the westerly winds all the year, but that the southern end of the mountain system loses the westerlies when the wind belt shifts northward in summer; the pupils therefore infer that the southern end has less rainfall than the parts farther north. In which portions would trees and bushes be most likely to cover the mountain slopes and valleys?

The chart of the ocean currents can be used to advantage in treating some regions, as the Sierra Nevada, valley of California, New England, etc.; but it is perhaps not to be expected that much will be done with this topic or its map, page 25 *CG*, beyond what is

given in the text of the various lessons. If the map is used, as *part of the old to help build the new*, the main study should be this: Do the winds which enter any region that is being studied come from over a cold ocean current or from over a warm one? The answer to this question will help to understand climate.

All the above facts can be *discovered* by the pupils before they study or even read the *text* of the lesson. Similar work can be done when studying each region treated in the lessons as far as the 96th; and it is unnecessary to repeat the suggestions under each. The teacher need simply refer to the notes of this lesson to see what steps may be taken.

The map study ought not by any means to stop with the above; but every feature, place or region named in the text of a lesson should at once be located on a map. This suggestion has already been made, but it should ever be kept fresh in mind.

The pictures form a very important part of each lesson. Some are suited to oral or written language lessons; others may be modeled in clay or sand, as types of natural features; still others, such as the geyser, the hot springs and the falls, page 30 *CG*, will at once appeal with sufficient force to the eye, and need no device to impress them. For notes on the uses of pictures, see pages 18–23. Not all pictures, of course, can be studied in such detail as the *Lapland home*, nor would such close study always be desirable; but this picture (page 19) serves to show the many sides from which a picture may be viewed, and thus suggests lines

of work with other pictures having perhaps only one or two of the elements of this one.

As a rule, use the pictures at the time when the text can best be supplemented by them. Thus the geyser and hot springs should receive attention when pupils are reading about those features in the text on page 31.

By the time pupils have reached this lesson they will surely have learned how to study the text of a lesson by *topics*. When reciting on any topic they should not only give *in their own words* the leading thoughts of the text, but they should also be ready to locate on a map all places to which reference is made, and to describe *briefly* the main features of such pictures as bear on the topic. Impress strongly the value of *locating* when studying; then half the battle of memory is won.

TOPICS: Rocky Mountain highland, Rocky mountains, Laramie plains, parks, famous peaks, Wasatch range, great rivers rising in the Rockies, Yellowstone park, mountain rainfall, forests, mines, Rocky mountains north of our country.[1]

35. The Sierra Nevada.

Refer to the notes of lesson 34, page 151 *M.* Use the maps there suggested for review. Do not overlook the pictures.

TOPICS: Sierra slopes, snow and rain, forests, gold mining, Yosemite, lower California.

[1] Direct the pupils to trace roughly the *continental divide* along the highland from Canada to Mexico, — that is, to find the line separating the rivers of the Atlantic slope from those of the Pacific.

36. The Cascade Range.

See suggestions for review in lesson 34, page 151 *M.*

TOPICS: Peaks of Cascade range, gorge of Columbia river, winds and rain, forests, Fraser river.

37. The Great Basin.

Re-read the notes of lesson 34, page 151 *M.* On the relief map on page 32, trace the boundary of the *Basin region;* find, also, the finely dotted line which marks the southern limit of the *Great Basin.* Observe that part of the *Basin region* is drained by rivers flowing to the gulf of California, while the *Great Basin* has no outlet.

TOPICS: Basin ranges and troughs, streams, canals, salt lakes, Humboldt river, Death valley and Mohave desert.

38. The Colorado Plateaus.

Do not forget the suggestions for review, lesson 34, page 151 *M.*

The three lower pictures on page 36 *CG* and the two middle pictures on page 37 are excellent subjects for modeling.

TOPICS: Colorado plateaus, rainfall, Colorado canyon, people, Cliff-dwellers.

39. The Columbia Plateau.

See notes of lesson 34, page 151 *M.*

TOPICS: Surface of Columbia plateau, winds and rainfall, soil, Snake river and Shoshone falls.

40. The Coast Range and Valleys.

Review these subjects by using the maps suggested in lesson 34, page 151 *M.*

TOPICS: Coast range, redwood, Mt. Hamilton, valley of California, San Francisco, southern California, Willamette valley, Columbia river, Puget sound, forests near the sound.

41. The Yukon Region.

Treat this subject according to lesson notes on page 151 *M.*

TOPICS: Northward from the Columbia, peninsula of Alaska, Yukon river, southwest coast, Mts. Logan and St. Elias, Pribilof islands.

42. Highland of Mexico.

Read notes of lesson 34, page 151 *M.* Use the relief map of North America, page 28 *CG.*

TOPICS: Surface of Mexico, Orizaba and Popocatepetl, coast region, winds and rain, rivers, harbors, climate, people, city of Mexico, Vera Cruz.

43. Central America.

Follow the notes of lesson 34, page 151 *M.* Use the relief map of North America, page 28; also the political map on page 125, or plate *A* (supplement).

TOPICS: Surface of Central America, winds and rain, soil, people, Lake Nicaragua, ancient ruins.

44. The Appalachian Highland.

This lesson may consist wholly of map studies such as are suggested in lesson 34, page 151 *M.* Use principally the map on page 32 *CG.* On this map the name *Appalachian highland* does not appear, for this is a general term, like Rocky Mountain highland or central plain, applied to a *group of natural regions;* and these general titles are not given on the map, page 32, but only the specific names of regions.

The limits of the Appalachian highland are clearly shown by the coarsely dotted line which separates the region from the coastal plains on the southeast and southwest, and from the prairies and St. Lawrence basin on the northwest. The names of the specific regions which compose the Appalachian highland are given in lesson 44.

Pupils need not *now* try to memorize the names of these regions, for such work can be done as each of them is studied in a later lesson ; but by means of the maps on pages 32 and 34–35, lead the class to gain a general view of the Appalachian highland, its general trend from northeast to southwest, its great breadth, its parallel ridges and valleys, the rivers breaking across its ridges, its parts of greatest height, its mountainous area and its plateau area. Then, as the later lessons treat of each region, be careful to locate it with reference to the regions which bound it on all sides. Make constant use of the large map on pages 34–35.

TOPICS (of large type only) : Great central plain, Appalachian highland, winds and rainfall, forests.

45. Old Appalachian Range and Piedmont Belt.

Keep in mind the suggestions of lesson 34, page 151 *M.*

TOPICS: New England highland, White mountains, Connecticut valley, Green mountains, northern part of piedmont slope, Boston, highland southwest from the Hudson, Blue ridge, southern part of piedmont slope.

46. The Great Valley and Alleghany Ridges.

Do not forget the constant use of the maps, both in review and for advance work. Refer often to the relief maps on pages 32 and 34–35.

TOPICS: Great valley, rivers of Appalachian region, Hudson river, Mohawk river, Hudson gorge, Erie canal, New York, Alleghany ridges, gaps, coal and iron.

47. The Alleghany Plateau.

Use the maps; study carefully the fine picture of the Alleghany plateau, page 44 *CG.*

TOPICS: Surface of Alleghany plateau, products, Pittsburg, rivers, Ozark highland.

48. The Laurentian Highland.

Use the relief map on page 28 *CG*; also the other maps noted in lesson 34, page 151 *M.*

TOPICS: Surface of Laurentian highland, lakes and swamps, animals, people.

49. The St. Lawrence Basin.

Do not overlook the notes of lesson 34, page 151 *M.* Use the relief map on pages 34–35 *CG*; also the political map on plates *B* and *C* in the supplement. The map on page 32 *CG* shows the natural boundary of the St. Lawrence basin in our country.

TOPICS: St. Lawrence system, Great Lakes, St. Marys strait, the "Soo" or Sault Ste. Marie canal, Niagara falls and gorge, Welland canal, Montreal, Adirondacks, Lake Superior region, iron and copper, forests, Chicago, other lake ports.

50. The Western Plains.

Review by maps as suggested in lesson 34, page 151 *M.* Use the relief maps on pages 32, 34–35 *CG*.

TOPICS: Frozen plains, wooded plains, dry Western plains, rivers of the dry plains, Missouri-Mississippi, irrigation, Kansas City, Denver, Black hills, Staked plain, people.

51. The Prairies.

Use maps and pictures.

TOPICS: Bounds of prairies, winds and rainfall, prairie soils, products, floods, Chicago, Minneapolis, St. Louis, Texas prairies.

52. The Northern Plain.

Climate, soil; tundras, Mackenzie river, caribou, people, Nelson river, animals.

53. The Gulf Coastal Plain.

TOPICS: Slope of coastal plain, Southern plain, Gulf coast, Galveston, climate, products, Mississippi flood plain, Mississippi delta, New Orleans, Memphis and Vicksburg.

54. The Atlantic Coastal Plain.[1]

TOPICS: Bounds and shape of coastal plain, surface, climate, products of older portion, products of younger portion, coastline, ports of the northern part, ports of the southern part, Florida, West Indies.

55. South America.

See notes to lesson 32, page 149 *M.* Study the maps and pictures.

TOPICS: The two Americas, isthmus of Panama, plains, lesser highlands, heat belts, winds and rain.

56. Map Studies.

See notes to lesson 33, page 150 *M.* Train pupils to rely less on the map questions.

57. The Southern Andes.

The lessons on South America, as well as on the continents to follow, should receive the same kind of attention as lesson 34, page 151 *M.* Although topics are given for each lesson, it is not expected that each

[1] Read the footnote on page 51 *CG.*

will receive topical study or recitation. While the topical plan is doubtless the best for general work, the teacher should often give variety to the manner of presenting the lessons. See lesson plans on pages 5 to 16 *M.*

TOPICS: Coast, southern Andes, plain of Chile, winds and rainfall, products, Valparaiso.

58. The Middle Andes.

As pupils gain in power to study topically, use broader topics, till finally none are necessary. One chief end of study should be power to grasp the leading thoughts of a text without help in the shape of questions or topics. If, therefore, the topics do not seem to cover the text, remember that more and more should be grouped around each broader topic.

TOPICS: Plateau of Bolivia, Lake Titicaca, Andes of Peru, Incas, cinchona or Peruvian bark, rainless coast, Atacama.

59. The Northern Andes.

TOPICS: Surface, valley of Quito, volcanoes, Magdalena river, climate.

60. The Highland of Brazil.

TOPICS: Shape and surface, drainage, coast, climate, products, Rio Janeiro.

61. The Guiana Highland.

TOPICS: Surface, climate.

62. The Selvas.

TOPICS: Amazon basin, Amazon river, selvas, people, products, Para.

63. The Gran Chaco and the Pampas.

TOPICS: La Plata basin, gran chaco, pampas, climate, streams, products, Patagonia, people, Buenos Ayres, Montevideo.

64. The Selvas.

TOPICS: Orinoco basin, llanos, climate, products.

65. Map Studies.

See notes to lesson 33, page 150 *M.* Are the pupils gaining in power to read maps without the aid of map questions?

66. Asia.

See notes to lesson 32, page 149 *M.* Use the maps.

TOPICS: Size of Asia, general surface, heat belts, winds and rain.

67. The Altai Highland.

TOPICS: World ridge, Yablonoi range, Altai highland, rainfall and products.

68. Central Basin Region.

TOPICS: Desert of Gobi, basin regions of America and Asia, people.

69. The Highland of Tibet.

Surface of Tibet, climate, mountain ranges of Tibet, Indus and Brahmaputra, Himalayas, vales of Kashmir, Pamir plateaus, ranges from the Pamirs.

70. Highlands of Southwest Asia.

TOPICS: Southwest Asia, plateau of Iran, climate, passes, Persia, Tigris and Euphrates, products, the five seas, the Mediterranean coast, Dead sea, Arabia.

71. The Arctic and Caspian Slopes.

TOPICS: Coastal plain of Eurasia, Siberia, climate, tundras, Arctic animals, forest belt, Siberian railroad, rivers, steppes, Caspian and Aral seas.

72. The Pacific Slope.

TOPICS: Amur basin, Hoang-Ho and Yangtse rivers, delta plain of China, surface of inland China, products, canals, people, Mekong river.

73. India.

TOPICS: The Himalayas, rainfall of India, rivers of India, Ganges plain, products of the Ganges basin, Brahmaputra river, double delta of India, Hindus, the Deccan peninsula, people, great cities.

74. Asiatic Islands.

TOPICS: Japan islands, Fusiyama, bamboo, Japanese, Yokohama exports, East Indies, products of East

Indies, Java, Sumatra, Borneo, Philippines, Negritos, Manilla.

75. Map Studies.

See notes to lesson 33, page 150 *M.* Have the pupils now learned the map language? — that is, can they now read relief and drainage, without using the map questions? Are they gaining in power to read maps?

76. Europe.

See notes to lesson 32, page 149 *M.*

TOPICS: Size of Europe, general surface, coastline, heat belts, winds and rain, seasons.

77. Region of the Alps.

TOPICS: The Alps, Mt. Blanc, tunnels, Alpine lakes, occupations of the Swiss, Apennines, Cevennes, Jura mountains, Rhone river, northern border of Swiss plateau, Iron Gate.

78. The Spanish Peninsula.

TOPICS: Pyrenees, Andorra, Alhambra, Basques, surface of Spanish peninsula, climate, river valleys, products, Gibraltar.

79. The Po and the Apennines.

TOPICS: Monaco, Po valley, Alpine lakes, irrigation, products of the Po valley, Milan, Apennines, products of Italy, Vesuvius, Rome, San Marino, leaning tower.

80. The Balkan Peninsula.

TOPICS: Balkan range, surface of Balkan peninsula, Constantinople, Bosporus, Greece, coastline, Corinth, Athens.

81. The Plain of Hungary.

TOPICS: Plain of Hungary, Danube river, Austria-Hungary, Vienna.

82. The Scandinavian Peninsula.

TOPICS: Surface, coastline, winds and rainfall, Norway and Sweden, Lapps, products, cities, Iceland, Mt. Hecla.

83. The British Isles.

TOPICS: Islands of British Isles, climate; divisions of Great Britain; surface of Scotland, products, Glasgow; surface of England and Wales, products, ports, commerce; London, British colonies; surface of Ireland, coast, climate, products, Belfast; cliffs of Dover, Land's End, Hastings, lakes of Killarney.

84. Low Europe — Western Part.

TOPICS: Lowland of France, Landes, central France, south shore of North Sea, Netherlands, Belgium, Rhine river, uplands north of Swiss plateau, coastal plains along North and Baltic seas, rivers of western Low Europe, climate, products, people, centers of trade.

85. Low Europe — Eastern Part.

TOPICS: Plain of Russia, petroleum fields, climate of Russia, tundras, forest belt, Finland, plains around Black and Caspian seas, Volga river and basin, St. Petersburg, Odessa.

86. Africa.

See notes to lesson 32, page 149 *M.*

TOPICS: Suez canal, general surface of Africa, why little known till lately, belts of heat, winds and rain, deserts and forests.

87. Map Studies.

See notes to lesson 33, page 150 *M.* The map questions are fewer, because pupils should by this time be able to read the relief maps and describe the main features, — the great slopes, the river basins and systems, the coastline, etc.

88. Egypt and the Nile.

TOPICS: Plateau of Abyssinia, Nile river, Nile basin, flood plains and delta, Nile and the Mississippi, products of Egypt, people, Cairo, pyramids and Sphinx.

89. Northern Africa and the Sahara Desert.

TOPICS: Slopes of the Atlas ranges, north African people, desert of Sahara, desert people, surface of the desert, climate, the desert as a barrier.

90. Sudan.

TOPICS: Extent of Sudan, rainfall, Lake Chad, Negroes, Kong mountains, Niger river basin, Sudanese towns, people.

91. The Kongo Basin.

TOPICS: Surface of the Kongo basin, rainfall, Kongo river, Tanganyika, Kenia and Kilima-Njaro, Kongo products, animals, people, Kongo and Amazon basins.

92. Southern Africa.

TOPICS: Zambezi basin, Victoria falls, people of Zambezi basin, Kalahari, Orange river, Cape Colony, products of Cape Colony, people of Cape Colony, Cape Town, Madagascar.

93. Australia.

See notes to lesson 32, page 149 *M.*

As the various parts of Australia are not treated in special lessons, the text of lesson 93 should receive careful study.

TOPICS: Size of Australia, general surface, trade winds and rainfall, equatorial rains, Murray river basin, lakes, trees, animals, native people, white people, products.

94. Map Studies.

The notes to lesson 33, page 150 *M.* Unless pupils can now read the surface features of a continent, with-

out using map questions, the training has been weak or not of the best kind. The power to read maps is worth more to a pupil than the knowledge gained through learning the answers to the map questions under the various continents.

95. New Zealand, Papua and Other Islands.

TOPICS: New Zealand, Papua, coral islands, volcanic islands, Fiji islands, Friendly islands, Samoa islands, Micronesia, Caroline islands, Marshall islands, Gilbert islands, Hawaiian islands, Hawaii products, Honolulu, Kilauea, Mauna Loa.

96. Homes of the Races.

This lesson does not call for close study, but may serve rather as an oral reading lesson to introduce the subject of *races of men.*

By means of the pictures and text, try to impress the fact that people differ, not only in looks, but also in mode of living and habits of thinking. Refer in review to some of the pictures that show habits, dress, home life, etc., as the Lapp, page 1 *CG*; Ems, 13; Mexican village, 41; Fuegians, 57; Brazilians, 59; Indians, 60; Patagonians, 61; Tibetan, 64; Himalayan village, 65; all on page 72; Arabs, 91; Bedouins, 92; Negroes, 93; Kaffirs, 94; Australians, 95; Papuans, 98. Along the same line observe the dress of different peoples in such pictures as these: Eskimo boy, 20; Mexican, 41; Indians gathering bark, 56; Gaucho, 61;

Tibetan, 64 ; Japanese girls, 68 ; Hindu, 71 ; gondolier and piper, 79 ; Highlander, 83 ; Moors, 87 ; Egyptian, 89 ; Algerian, 91 ; Bedouin, 92 ; Samoan and Fijian, 97.

As the pupils examine each picture the teacher can tell something about the people or the country they live in. An entire lesson period may with profit be spent on such work.

TOPICS : How people of races differ, home of the Indian, the brown race, the yellow race, the black race, the white race, population of world.

97. The Negro or Black Race.

This lesson may be taken as an example for teaching lessons 97 to 103, inclusive.

The most important direction for all these lessons is — *use the maps ;* be sure that the home of each race is clearly defined in the mind of every pupil. Use not only the map on page 102 *CG*, but also the large relief maps of the continents and the political or colored maps of the same. Locate every country named in the text.

For lesson 97 use maps on pages 102, 88, 96, 173 and 175. Lead the pupils to *read the maps* and describe the surface and climate of the home of each race, before studying or reading the text about it. This work gives a setting to the view of the race.

Use the pictures ; lead the class to describe them. Even a glance at a picture of a Negro, a Kaffir or an Indian, will give a better idea of the personal appear-

ance than can be gained through any amount of text. Besides the pictures of the black race on page 100, use also Negroes, page 93, and Australians, 95.

TOPICS: Negro features, true Negro, Bantu people, Kaffirs, slaves, native Australians, Papuans, home of the black race, number.

98. The American or Red Race.

Read notes on lesson 97, page 170 *M.* Use maps constantly; locate every country named in the text. See the following pictures: Indian boy, page 1 *CG*; Indians, 60; Zuni Indians, 97; Blackfoot camp, 158.

TOPICS: Indian features, reservations, Indian Territory, Indians of Mexico and South America, old tribes of Peru and Mexico, home of the Indian race, number.

99. The Malay or Brown Race.

See notes of lesson 97, on page 170 *M.* Make constant use of maps. Refer to pictures, as follows: Javanese weaving, page 72 *CG*; Fijian, 97; Samoan, 97; Tonga girls, 98 and 99.

TOPICS: Malay features, home of the brown race, Maoris, number.

100. The Mongolian or Yellow Race.

Refer to notes of lesson 97, page 170 *M.* Locate all places on maps. Use pictures as follows: Lapp, page 1 *CG*; Japanese, 1; Eskimo, 20; Japanese girls, 68; Chinatown, 124.

TOPICS: Mongolian features, home of the yellow race, Mongolian inventions, yellow people of Arctic slope, number.

101. The Caucasian or White Race.

See the general notes to lesson 97, page 170 *M.* Use the maps and the pictures. Besides the pictures on pages 104–105, see the Nile boy, page 1; Mexican, 41; Gaucho, 61; Hindu, 71; Gondolier 79; Piper, 79; girls at Pompeii, 79; Apollo, 80; Norwegian, 81; Highlander, 83; Russians, 85; Moors, 87; Egyptian, 89; Arabs, 91; Algerian, 91; Bedouins, 92; Mexican boy, 160; Madras natives, 170, — all belonging to the white race.

All the people pictured on page 104 belong to the light or Aryan branch; all on page 105, except the two Hamites, belong to the dark or Semite branch. It will thus be seen that all the people pictured on pages 104–105 belong to the white race.

TOPICS: Home of the white race, Aryans, Semites, Hamites, number.

102. Religions.

Refer to notes of lesson 97, page 170 *M.*

As a rule we may say that religions and governments are race or ethnic characteristics; thus, the Malays are Mohammedans, having absolute monarchies; the Negroes are idol worshippers, having the tribal government; the Mongolians are largely Buddhists, having absolute monarchies; the Indians are idol worshippers,

having the tribal government; the white race is in branches, — the Aryans professing Christianity and having constitutional monarchies or republics, while the Semites believe in Mohammed and have the absolute monarchial form of government. There are a few great exceptions to the above rule, notably Russia, a Christian land with an absolute ruler; Japan, becoming in recent years a constitutional monarchy; Haiti and Santo Domingo, though their population is chiefly Negro, are republics.

In teaching the distribution of both religions and governments, the teacher will do well to keep the above broad classification in mind.

Use the maps; stamp this indelibly on the mind.

TOPICS: Pagans, Brahmanists, Buddhists, Christians, Jewish people, Mohammedans.

103. Governments.

Re-read the notes of lessons 97 and 102, pages 170 and 172 *M.* This lesson demands the constant use of maps.

TOPICS: Tribal form, absolute monarchy, limited monarchy, republic.

104. Review of the Races.

This lesson should receive a great deal of attention and should be thoroughly learned. The answers to the questions call for the review of lessons 97 to 101, and the work can, with great profit, be extended by asking pupils to tell the religion and government of

each country named, thus reviewing lessons 102 and 103.

By using a printed outline map of the world, or a tracing of the center map on plate *X* of the supplement, the home of each race can be shown by drawing heavy boundary lines. Better still, perhaps, would be a map in relief, like that on page 5 *CG*.

Be sure that the pupils can locate every country or colony named in the lesson. For this purpose use the colored maps in the supplement.

105. Where Plants grow.

The object of these questions is to direct attention to the relation of plants to water, soil, heat, etc., and to the uses of plants to man. This lesson does not call for study, but may take the form of oral language work. Consider the lesson well taught if pupils are led to closer observation of plants in the school district.

TOPICS: The questions and directions which compose the lesson will take the place of topics.

106. Soil, Water and Heat.

In plan and purpose this lesson is like the 96th *CG*. It leads to a better understanding of the text on pages 108 to 111 *CG*. Lesson 106 gathers up some of the leading thoughts of lesson 105. It is not a lesson for close study, but is rather for oral reading and discussion in class.

Good use can here be made of pictures. See the date palm growing in the desert, page 1 *CG*; coarse

grass thriving in beach sand, 9; pines standing in a snow-covered coastal plain, 13; sagebrush struggling for life on a lava plain, 15; ferns growing on trees in tropical India; cactus and yucca trees in a sandy desert, 38; orange tree and vineyard of southern California, 38 and 39; evergreen trees rooted in soil on the top of a great river of ice or a glacier, 40; beautiful rhododendron shrubs covering hundreds of acres near Mt. Mitchell, 42; cypress trees in a swamp, 43; mosses, 50; cotton, sugar cane and pines of the southern coastal plains, 51; rice in a swamp, 52; tropical forest, 60; trees in water, 61; coarse grass of the cold, wind-swept steppes, 68; bamboo and banyan, 73; palms on the irrigated Nile bank, 90; palms near an oasis, 92; tree ferns in tropical Australasia, 95; Greenland moss and poppies thriving where the snow leaves the ground for only a few weeks in summer, 111; dwarf willows, only a few inches high, peeping through the Arctic snow, 111.

Surely a lesson period can, with great profit, be spent in the study of pictures showing the relation of plants to such a variety of conditions, — some in deserts, others in swamps; some in the hot and damp forests of the tropics, others in the Arctic snow fields; some on fertile lowlands, others on steep mountain sides; some where warm or hot seasons last all the year, others where the bitter cold of winter gives way to only a few cool summer weeks, etc. The study of such pictures will lay a firm basis for the lessons on plants.

TOPICS: Where plants live, length of season needed, transporting plants.

107. Plants of the Hot Belt.

This lesson will serve as a type for teaching the other three lessons on the plants of the heat belts.

Review the *surface*, *winds*, *rainfall*, *seasons* and *people* of the hot belt. That is, look back over the relief maps and recall what lands of the hot belt are plateaus, lowlands, deserts, river valleys, etc.; which are reached by the trade winds or by the weak winds of the equatorial calm belt; which are open to sea winds bearing vapor, and which are on the lee or rainless sides of great highlands; which have the warm or hot seasons of the lowlands or the changing seasons of the highlands; which are peopled by white men, by Indians, by Negroes, by Malays, etc. Refer to the maps on pages 18, 21, 24, 25 and 102. Such a review is very helpful; it uses the old to help build the new.

As the text is studied the pupils should look for pictures of the plants. Many of them will be found on the page with the text. See also cocoa palm or cocoanut, page 95 *CG*; bamboo, 73; spices, 73; coffee, 59; cotton and sugar cane, 51; rice, 52; tree ferns, 95; tropical forest, 60.

TOPICS: Cocoa palm, cabinet woods (ebony, etc.), bamboo, food plants, spices, clothing or fiber plants.

108. Plants of the Warm Belts.

Read carefully the suggestions of the preceding lesson. The review is one of the most important features.

Besides the pictures on page 109 *CG*, see the following: fig tree, page 66 *CG*, date palms along the Nile, 90; vineyard, 39; orange tree, 39; tea, 1; feeding silkworms, 68; cactus, 38; century plant, 41.

TOPICS: Fruits, cotton, rice and other grains, tea, mulberry, cactus, century plant, irrigation.

109. Plants of the Cool Belts.

Re-read the notes of lesson 107, page 176 *M*.

In addition to the plants shown on page 110, see the following: prairie scenes, page 49; grain farm, 152; corn harvest, 132; cone-bearers (pines, spruce, etc.), 13, 14, 42, 44, etc.; big trees, 32.

TOPICS: Grains, fiber plants, forests, fruits, vegetables.

110. Plants of the Northern Cold Belt.

Review according to the suggestions in lesson 107, page 176 *M*.

For polar scenes, besides those on page 111 *CG*, see pages 1, 9, 10, 20, 39 (seals), 50, top of 114 and 115.

TOPICS: Trees, tundras, flowering plants.

111. Animals, — their Habits and Uses.

This lesson resembles the 105th in plan and purpose. It seeks to direct the attention to the relation of animals to their surroundings. Lesson 111 may be used for oral language; it need not be studied. Omit the references to animals with which the pupils are not

familiar, and ask questions about such as are common in the school district.

Most of the animals named in the text are pictured on pages 112 to 118.

TOPICS: The questions will take the place of topics.

112. Animals and their Homes.

In plan and purpose this lesson is like the 96th and 106th. Re-read the notes of those lessons, pages 169 and 174 *M.*

The text of lesson 112 seeks to direct attention to the relation of animals to their habitats or natural haunts. It thus prepares for the study of the distribution of animals, pages 113 to 118.

Use this text for oral reading and discussion, but not for close study. Refer to the pictures, especially those on page 112.

Knowledge of the structure and habits of particular animals is not the object of this lesson, but it is through just such study that we rise to the higher truths of the adaptation of animals to their native haunts. In the sentence, "Frogs lay eggs in ponds where their tadpoles can feed," the quibbler may find what he judges to be an unimportant fact; but the thoughtful reader will find in it a wonderful example of the adaptation of animals to their environment, opening a world of marvelous beauty and sequence.

As an example of the higher lessons that come from the study of just such facts as that of the frog laying eggs where the tadpoles can feed, the following true story

may point a moral to the quibbler. Years ago a young teacher on his way to teach in a so-called "difficult" district, caught his first glimpse of the pupils ranged along a pond *stoning frogs*. Several of the wonderful little creatures lay dead upon the water, while others with broken legs or gashed sides were struggling to escape.

That day the pupils had a lesson about *frogs*, — their breathing apparatus, temperature, strong hindlegs, vocal organs, etc. Next day came another lesson about *frogs' eggs*, then the eggs were placed in a glass jar to hatch. After a time came several lessons on the wonderful transformation through the *tadpole* stage, the growing of the legs, the sorbing of the tail, the change in breathing apparatus, etc. The interest was keen; not the slightest reference was made to the stoning of frogs; yet from that first day no pupil was seen to throw a stone at the wonderful little amphibians.

This story may seem to wander from the text of the lesson, yet it should teach a deep truth. If you would make a child kind to animals, lead him to *discover* something of their beauty, strength and functions. The child, the man in the savage stage, *first learns to love that which he knows*, then rises to the higher level of loving the unknown, — all making the great whole of which he himself is a part.

"For every fledgling idea in the text, there are a dozen pecking at the word-shells."

TOPICS: Structure and food, covering, homes, struggles, means of defense, barriers to travel, domestic animals, realms.

113. South American Realm.

This lesson will serve as an example for teaching from pages 113 to 118 *CG*. Review the *surface*, *winds*, *rainfall*, *seasons* and *people* as suggested in lesson 108, page 000 *M*, with special reference to the conditions that favor or hinder the increase in animal life. The *plants* have just been studied.

As the text is studied the pupils should look for pictures of the various animals. There seems to be no better way to direct the observation to the animals than by having the pupils draw them. In many schools beautiful work is now being done along this line. Do not expect perfect work too early; a little practice will show marked advance. In reciting upon a topic, the pupils should either sketch from memory or describe briefly each of the large and important animals.

Refer to the map on page 111 *CG* and locate each realm, as it is studied. Try to bring out the adaptability of each important animal to its native haunt; thus, the jaguar, with its sharp claws for seizing its prey; the ant-eater, with its long, sticky tongue which catches ants; the peccary, with its strong nose for rooting, etc. By the study of the pictures and the text, the pupils will quickly grasp the characteristics of the various animals.

TOPICS: Locate the realm, llama and alpaca, vicuña and guanaco, rhea, cattle and sheep, jaguar and puma, condor, tapir, ant-eater, boa, armadillo, sloth, iguana, peccary, alligator, monkey, birds.

114. Northern Realm.

Re-read the notes of lesson 113, page 180 *M.* Locate this realm.

TOPICS: Bear, bighorn, chamois and ibex, Kashmir goat, yak, cattle and sheep and horse, bison and buffalo, fur-bearing animals, elk and moose, reindeer, seals and sea-fowl, whale, walrus.

115. African Realm.

Read the suggestions in lesson 113, page 180 *M.*

TOPICS: Apes, camel, African elephant, lion and leopard, rhinoceros, giraffe, ostrich, crocodile, tsetse fly, cattle, Cape buffalo, zebra and quagga.

116. Oriental Realm.

The notes of lesson 113, page 180 *M*, apply also to this lesson.

TOPICS: Orang-outan (or orang-utan), zebu, buffalo, Asiatic elephant, tiger and lion, rhinoceros, gavial.

117. Australian Realm.

See notes of lesson 113, page 180 *M.*

TOPICS: Pouched animals, kangaroo, emu, apteryx, duck mole, echidna, birds, sheep and cattle.

118. Other Products of the Sea.

Use this short lesson for oral reading and conversation. Locate all places named in the text.

TOPICS: Pearls, sponges, fish, turtles.

119. Domestic and Foreign Commerce.

This lesson presents no difficulty, but calls for the simplest form of topical study.

TOPICS: Why goods are exchanged, trade, commerce, domestic, foreign, rank of countries in commerce, principal exports and imports of the United States.

120. Highways of Trade, — Water Routes.

This entire lesson may be used for oral reading and discussion. Lay stress on the following topics.

TOPICS: Different modes of carrying goods, — rivers, lakes and inland seas, oceans, seaports.

121. Railroads.

This lesson is merely a continuation of the preceding and may be treated in the same way.

TOPICS: Charges by rail, building of railroads in our country, length and value of railroads in the United States, growth of railroads.

122. Aids to Commerce.

Use this lesson for oral reading and discussion.

TOPICS: Coast improvements, consuls, cables, mails, telegraph and telephone lines.

123. Time Belts and International Date Line.

Lead the pupils to answer the questions in this text. Use the rest of the text for a reading lesson.

TOPICS: True or mean solar time, time belts, railroad time, civil day, need of a date line.

124. Distribution of People.

In lessons 34 to 54 the pupils have studied the surface of our country, its winds, rainfall, seasons, chief products, leading cities, etc. They now come to a more detailed study of the United States, especially in its industrial and commercial relations with other lands. First of all should come a broader knowledge of the people that conduct the industries and the commerce.

TOPICS: French explorers, Spanish explorers, English settlers, why the English did not at first spread inland, 1776, thirteen colonies, United States of America, how the prairies were settled, southern plain, cotton gin, slavery, gold and silver, immigration. Answer the questions at the end of the lesson.

125. Government.

This lesson can perhaps best be studied topically.

TOPICS: Constitution of the United States, amendments, legislative branch, President and Cabinet, a bill and a law, the Supreme Court, government of the states, territories, District of Columbia and Washington.

126. Map Studies.

This lesson is simple and needs no suggestions for teaching. Care has been used to make such questions

as will call for useful information, and the lesson should be thoroughly learned.

127. Climate, Temperature.

Study carefully the three maps or charts of temperature. Chart *A* shows which portions of our country experience the greatest range in mean temperatures of the hottest and the coldest months; that is, the average of mean temperature of the hottest month is compared with the mean temperature of the coldest month, and the difference between these temperatures is shown on the map.

Thus, the map shows that the heat is more uniform in the southern and Pacific States, where the range is from 30° to 40°, than in the north-central part of the country, where the range is over 60°. The pupils can doubtless account at least in part for this difference before reading the text. Lead them to think of the effect of winds, ocean currents, elevation, etc. One fact discovered is worth many facts told.

Chart *B* shows the average daily temperature for July. Explain to the pupils that some July days are hotter than the mean, while others are cooler, but that the map indicates the average or mean. With this chart also lead the pupils to discover causes,— for example, the mild Pacific winds, the cool winds from over the Labrador current, the broad heated interior of the continent, the lofty region of the Rockies and the Sierra Nevada, etc.

Chart *C* affords a key to midwinter temperature and

shows which parts of the country are most liable to have heavy frosts. This is important as it affects the growth of many kinds of fruit and vegetables, as oranges, lemons, bananas, pineapples, sugar cane, rice, etc.

TOPICS: Location of United States, range of temperature in the northern interior, contrast of southern and northern boundaries, Pacific coast climate, range along the Atlantic coast.

128. Climate, Winds and Rainfall.

The constant reviews of the winds and the rainfall in connection with the study of the continents have doubtless made the pupils thoroughly familiar with the general facts of these subjects; if not, lessons 28 and 29 should now be reviewed.

As in the preceding lesson, study the maps; also read carefully the small-type notes under them.

TOPICS: Winds of winter and summer, effect of storm eddies, northwest coast, southwest coast, western interior, eastern half of United States, western plains, southern coastal plain, Carolina highland, distribution of rain for the year, contrast of eastern and western coasts.

129. Cotton.

This lesson will serve as a type for lessons 129 to 138.

Refer constantly to the relief map of the United States, page 127 *CG*, and find out what natural or

geographic region or regions are included in the area being studied. Thus, the relief map shows that cotton is found chiefly in the coastal plain and the Texas prairies; also that this useful fiber plant thrives in the Carolina piedmont belt.

Review the climate — winds and rainfall — of the cotton belt; refer to the maps on page 127, 128 and 129.

As the products and industries of each region are studied review *briefly* the principal facts learned about each region in lessons 34 to 54, especially such facts as bear upon the new lesson. See what light each new lesson throws on the map of the *people*, page 124 *CG*.

TOPICS: Cotton and climate, Sea-island cotton, cotton products, cotton states, cotton ports, cotton manufacture, export trade, manufacturing countries.

130. Wheat.

Read the notes of lesson 129, page 185 *M*.

TOPICS: Wheat area, cities noted for flour, wheat ports, wheat countries.

131. Indian Corn.

See suggestions for lesson 129, page 185 *M*.

TOPICS: Corn and climate, corn belt, uses of corn, corn ports, corn trade of the United States.

132. Oats, Barley and Rye.

Treat this lesson like the 129th, page 185 *M*.

TOPICS: Oats, barley and rye.

133. Tobacco.

Lesson 129, page 185 *M*, will serve as a type for this lesson.

TOPICS: Tobacco plant, curing, tobacco districts, cities noted for tobacco, countries noted for tobacco, export trade.

134. Forests.

Re-read the lesson notes under the subject *Cotton*, page 185 *M*.

TOPICS: Trees on Western plains and in Basin region, forests in prairies, eastern half of United States, lumbering, lumber cities, furniture, soft-wood belt, hard-wood belt, forests of the coastal plain, lumber products of United States.

135. Fruits.

Review according to suggestions in lesson 129, page 185 *M*.

TOPICS: Peach area, apples and pears, grapes and raisins, oranges and lemons, bananas.

136. Horses, Hogs and Mules.

See suggestions under lesson 129, page 185 *M*.

TOPICS: Horses and mules, hogs, pork products, export trade.

137. Cattle and Dairy Products.

This lesson may be treated like lesson 129, page 185 *M*.

TOPICS: Cattle regions, cattle districts of United States, great meat-markets, tanning, boots and shoes, dairy products, export of cattle products.

138. Sheep.

Follow lesson notes on page 185 *M*, lesson 129.

TOPICS: Wool, sheep districts, woolen manufactures, leading wool regions of the world.

139. Fisheries.

TOPICS: Oysters, cod and haddock, halibut, banks of Newfoundland, clams and lobsters, mackerel, salmon, Gloucester.

140. Coal.

TOPICS: Coal fields, leading states, coke, charcoal, cities having largest coal trade, leading coal countries.

141. Iron.

TOPICS: Principal iron ore districts, smelting, Lake Superior ore, iron manufacturing cities, leading iron countries, exports and imports of iron.

142. Petroleum and Natural Gas.

TOPICS: Crude petroleum, two great oil fields, principal oil states, leading cities for refining, export trade, natural gas, leading gas states, uses of oil and gas.

143. Gold and Silver.

TOPICS: Gold mining, gold fields of the world, chief silver countries, output in the United States.

144. Copper and Other Metals.

TOPICS: Three copper districts of our country, uses of copper, lead and zinc, tin.

145. Building Stone.

Try to obtain specimens of each kind of stone mentioned in this lesson, and let the pupils become familiar with them through seeing and handling them.

TOPICS: Value, limestone, marble, granite, sandstone, bluestone, grindstones, slate.

146. Review and Map Studies.

Neither this lesson nor other map studies to follow will present any difficulties, and no suggestions are needed to make the work simple.

147. New England States.

From this part of the geography to the end, the text of the various lessons follows the same general plan, namely, the study of groups of states, of cities and of countries, from the standpoint of industries and matters of special importance. Perhaps the best topics that can be used are the names of cities printed in heavy-face type, as **Boston**, and names of countries printed in

capital letters, as GERMANY. Occasionally the lesson-heading forms an excellent introductory topic, as in lesson 168, **The British Isles.**

It is perhaps needless to seek further to impress upon teachers the great value of constant reference to the maps. The pupils should locate every city, trying if possible to state its position near some natural feature which affects its industries, as Lowell, on the Merrimac; New York, on New York bay; Chicago, on Lake Michigan; Denver, on the Western plains near the Rocky mountains, etc.

In beginning the study of any section or country, make use of the old to help build the new; that is, review briefly the surface, climate, leading industries, etc., and let the study lead as far as possible to the reasons for the growth of the city, state or country.

In many cities and towns, the school officers or the teachers may not deem it necessary to study in detail every *city* named in the text; but if selection is made of leading cities to receive close study, it is suggested that the *locations* of the others be learned. Of far greater importance than the memorizing of lists of exports or imports, of agricultural or manufactured products, that help in the growth of particular cities, is the general view of the industries of the great *natural regions* in which the cities have developed.

Lessons 148 to 179. End of Geography.

Each of these lessons resembles in plan either the 146th or the 147th lesson.

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